Philippine Hoya Species

A Monograph

By

Dale Kloppenburg

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Acknowledgements

In the present study I have attempted to give as far as possible, a presentation of each taxa found in the Philippines. This work is based upon a study of herbarium sheets, copies of herbarium sheets and on living plants, collected personally as well as from other interested collectors. Copies of many herbarium sheets along with attached drawings, from Berlin, Harvard and the Smithsonian were presented to me for use in this monograph by Christine M. Burton, editor of "The Hoyan".

I have examined sheets at Bogor, Indonesia, Singapore, Pertanian and Kuala Lumpur in Malaya, Los Banos and the National Herbarium in the Philippines, University of California Berkeley and others. I am indebted to many people for material from the Philippines, and especially to Professor Juan V. Pancho UPLB Los Banos, Philippines, and collector Maximo K. Wayet, Dexter Heuschkel Manila Memorial Park, Philippines, and collector Blass Hernaez, and to Domingo Madulid of the National Herbarium, Manila, Philippines. I am indebted and grateful to R.D. Medina, Botanical Artist, for his contribution of drawings to this publication. I also received much help from the herbarium staff at the UC Berkely Herbarium, in Berkely, California.

I am especially thankful to Ann Wayman, secretary of The International Hoya Association and editor of "Fraterna" for her tireless devotion in helping to get this work ready for publication. Most of all, I am indebted to my many friends and fellow hoya growers who have kept me supplied with fresh flowers and living plants, and through patience, love and encouragement have urged me to continue.

Dale Kloppenburg

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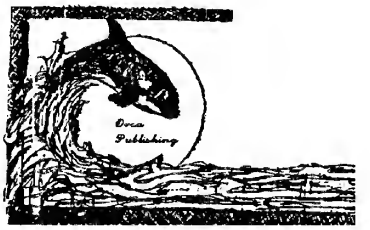

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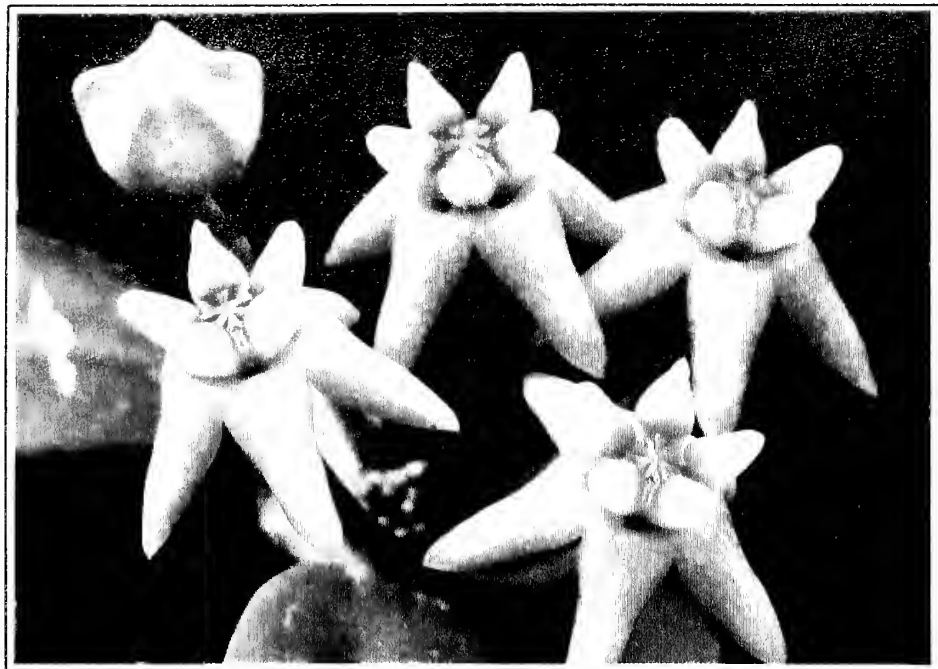
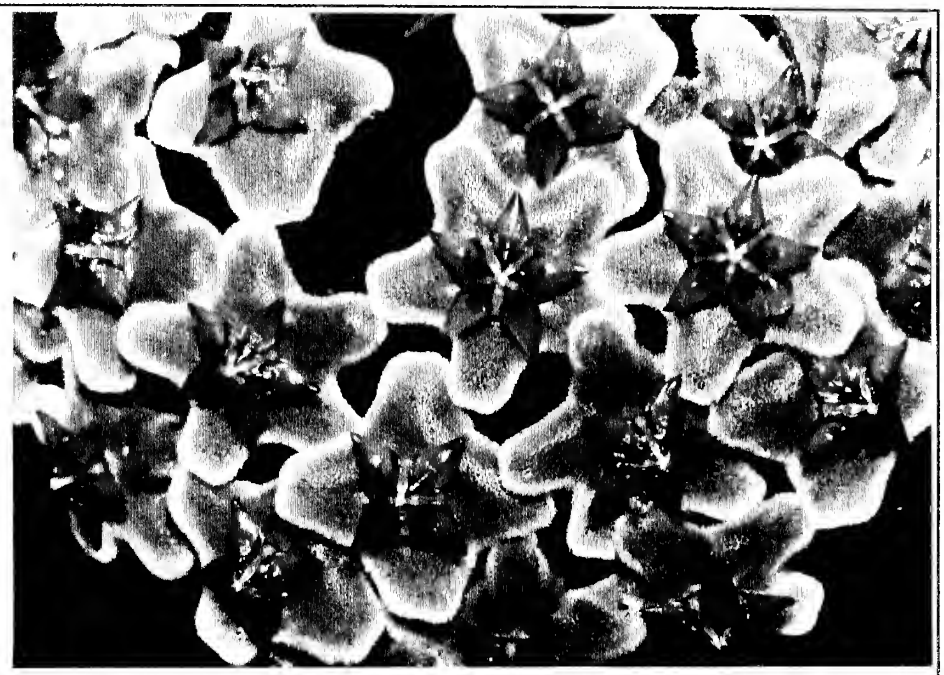
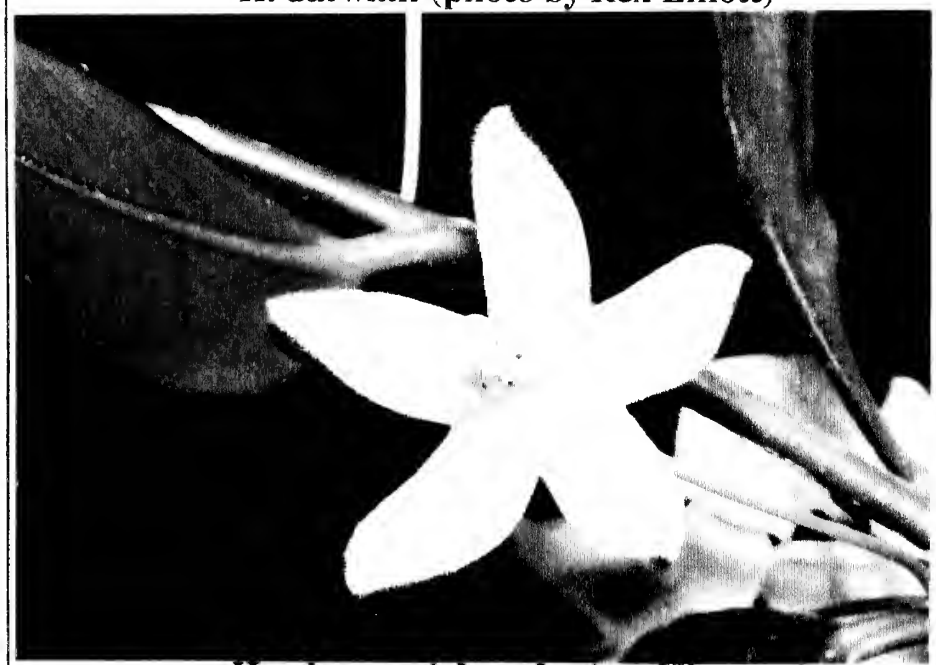


H. darwinii (photo by Rex Elliott)



H. pubicalyx (photo by Ann Wayman)



H. odorata (photo by Ann Wayman)

H. cumingiana (photo by Ann Wayman)

A KEY TO PHILIPPINE HOYA SPECIES

1a Plant bushy, shrub-like, not much twining.	2a
1b Vine-like plant.	6a
2a Corolla reflexed.	3a
2b Corolla rotate, few flowers.	4a
3a Leaves ovate, enervis, sessile.	1) Hoya cumingiana
3b Leaves broadly lanceolate, petiolate, pinnate.	2) Hoya multiflora
4a Leaves elliptic or lanceolate, few flowers, corolla rotate, very fragrant.	3) Hoya odorata
4b Inner corolla (base) surface glabrous.	5a
5a Flower odorless, purple center, narrow sepal, edge ciliate.	4) Hoya paziae
5b Calyx surface ciliate, outer 1/2 of inner corolla surface ciliate.	5) Hoya cembra
6a Leaves circular, imbricate. (one aborts)	6) Hoya imbricata
6b Leaves opposite or whorled.	7a
7a Leaf venation palmate or plinervis.	8a
7b Leaf venation otherwise. (enervis, pinnate)	15a
8a Leaf base broad, rounded.	9a
8b Leaf base narrow to pointed, plinerved.	11a
9a Venation quinquinervis.	7) Hoya quinquinervia
9b Venation quintuplinervis	10a
10a Leaf large 8-16 cm. x 6-9 cm., corrugated, often lacunose, corona scale outer lobe straight, inner elevated.	8) Hoya pentaphlebia
10b Leaf smaller 6-9 cm. x 5-6 cm., smooth, corona scale outer lobe tip reflexed, higher than inner apex.	9) Hoya merrillii
11a Calyx sparingly pubescent, flowers cremorius, leaves 11-18 cm. long.	10) Hoya bordenii
11b Calyx glabrous.	12a
12a Leaves long 12-19 cm. x 5-6 cm. broad.	13a

12b Leaves shorter 6-11 cm. x 2.5-4 cm. broad.	14a
13a Flower parts glabrous, sepals ovate-obtuse.	11) Hoya palawanica
13b Sepals broadly laceolate, corolla inside papillose.	12) Hoya fischeriana
14a Flowers red, inner corolla surface finely papillose, peduncle 7.5 cm. long.	13) Hoya benguetensis
14b Flowers white/pink, cilia at corolla sinus only.	14) Hoya mcgregorii
15a Leaves enervis or indistinct.	16a
15b Leaves pinnately veined.	28a
16a Leaves long and narrow 12 x 3 cm.	15) Hoya pubifera
16b Leaf shorter or length/width ratio greater.	17a
17a Flowers with bilobed extensions on outer corona lobes. (Section acanthostemma)	18a
17b Flowers without distinct bilobed extensions.	24a
18a Corolla urceolate.	16) Hoya heuschkeliana
18b Corolla otherwise.	19a
19a Leaf edge revolute, pedicels curved.	20a
19b Leaf edge straight, pedicels straight.	21a
20a Leaf under surface papillate, glabrous.	17) Hoya tsangii
20b Leaf surface papillate and puberulous.	18) Hoya burtoniae
21a Leaves of same shape, different dimensions.	19) Hoya gracilis
21b Leaves of two distinct types.	22a
22a Corolla inner surface glabrous except ciliate margins.	20) Hoya panchoi
22b Corolla inner surface puberulent.	23a
23a Majority of leaves tapering at both ends, small.	21) Hoya leytensis
23b Majority of leaves obtuse, round, small	22) Hoya bilobata
24a Corolla glabrous inside.	25a
24b Corolla puberulous inside.	26a

25a Sepals broadly ovate lanceolate with short dense cilia, column very short.	23) Hoya pulgarensis
25b Sepals ovate lanceolate, short thinly ciliate.	24) Hoya halconensis
26a Corona outer lobe apex obtuse.	25) Hoya meliflua
26b Corona outer lobe acute.	27a
27a Leaf oblanceolate-elliptic, short acuminate.	26) Hoya mindorensis
27b Leaf oblong-ovate, distinct acuminate.	27) Hoya pubicalyx
28a Leaves over 10 cm. long.	29a
28b Leaves under 10 cm. long.	32a
29a Sepals narrowly long, ciliate.	28) Hoya angustisepala
29b Sepals otherwise.	30a
30a Leaves dimorphic, normal and bullate.	29) Hoya darwinii
30b Leaves not dimorphic but large.	31a
31a Flowers purplish, leaf base not broadly rounded.	30) Hoya alagensis
31b Flowers cream, corolla tips bronze, leaf ovate oblong. 9-14 x 5-6 cm.	31) Hoya incrassata
32a Leaf base cordate.	32) Hoya cardiophylla
32b Leaf base otherwise.	33a
33a Whole plant pubescent or ciliate.	34a
33b Plant and flower glabrous.	35a
34a Column very short.	33) Hoya ciliata
34b Column very long, glabrous.	34) Hoya madulidii
35a Flower 1.4 cm. diameter.	35) Hoya cagayanensis
35b Flower 0.6-0.7 cm. diameter.	36a
36a Corolla involute, lobes not channeled, pedicels curved, different lengths.	36) Hoya obscura
36b Corolla rotate to cupped, rose colored, small.	37) Hoya camphorifolia

Approximate altitudes where Philippine Hoya Species Grow

- cardiophylla ---------- Low
- madulidii ---------- Low
- palawanica ---------- Low
- pubicalyx ---------- Low
- pulgarensis ---------- Low
- (reticulata) ---------- Low
- obscura ---------- Low
- incrassata ---------- Low
- heuschkeliana ---------- Low
- mindorensis ---------- Low - 70m
- (crassicaulis) ---------- 76m
- bilobata ---------- Low - 150m
- meliflua ---------- Low - 150m
- (pubifera) ---------- 150m
- alagensis ---------- 150m
- pentaphlebia ---------- Low - 250m
- leytensis ---------- Low - 250m
- merrillii ---------- Low - 250m
- mcgregorii ---------- Low - Medium
- quinquinervia ---------- Low - Medium
- cagayanensis ---------- Low - Medium
- darwinii ---------- Low - Medium
- (pseudomaxima) ---------- Low-Medium
- burtoniae ---------- 300m
- cembra ---------- 300m
- camphorifolia ---------- 370m
- panchoi ---------- 460m
- ciliata ---------- 350 - 450m
- benguetensis ---------- Low - 490m
- imbricata ---------- 0 - 500m
- bordenii ---------- 650m
- fischeriana ---------- Low - 660m
- multiflora ---------- 660m
- paziae ---------- 900m
- gracilis ---------- 900m
- angustisepala ---------- 400 - 900m
- halconensis ---------- 900m
- tsangii ---------- 300m-1230m
- cumingiana ---------- Low - 2000m
- odorata ---------- Low - 2000m

Introduction

As we continue to expand our knowledge, it is necessary for us to pause and place into print the enumerations of the past and to express our thoughts on recent findings. Each generation is thus able to move forward, hopefully using the thoughts and knowledge of the past as their springboard. It has been a number of years now since the hoyas of the Philippines have been thus treated.

Since the founding of 'The Hoya Society International' in 1979, our knowledge of this genus has been considerably enhanced by this organization and its many devoted members. With the subsequent founding of the 'International Hoya Association' in 1988, with emphasis on culture and education in a more non-technical vein, the hoya genus has lost much of its complexities and has truly taken its place among the more popular houseplants.

Taxonomy is never a static science; we are constantly adding tools that will invariably give us new insights into the concept of species. There will always be, however, those who split even the slightest variations into a different species, as well as those who lump many taxa, and call them one. Our objective is communication so as to have a base upon which we can attach all information. As long as we do not lose sight of the least significant variations of the plants we love and study, we will have accomplished our goals.

The first mention of Philippine hoyas that is known, is of Father M. Blanco's description of Stapelia meliflua Blanco, now considered Hoya meliflua (Blanco) Merrill, in Flora De Las Islas Filipinas 1837, with subsequent editions in 1845, 1877-1883. Three more species were added by Decaisne in 1844 in DeCondolle's Prodramus, Vol.8, pp.636-637. These are Hoya cumingiana Decaisne found by Hugh Cuming on Mindanao, Hoya imbricata Decaisne collected on mountains in Palawan Island and Hoya ruscifolia Decaisne found in the Igorots Mts. of Luzon and described in Latin from a sheet without flowers in the Paris Museum. We find one other Philippine hoya reference in Flora De Filipinas by Agustino Cazelo 1845 which refers to Hoya carnosa, not believed to be endemic here.

There appears to be no further published work on Philippine hoyas until the 1900's when there was a flurry of activity. Perkins, in Fragmentia Florae Philippinae (1904) Vol. 1 pp. 129-132 covers 9 species, giving Latin descriptions to 6. Those thus described are H. camphorifolia Warburg, H. fischeriana Warburg, H. incrassata Warburg, H. luzonica Schlechter, H. merrillii Schlechter and H. quinquinervia Warburg. The 3 others mentioned are H. diversifolia Blume for which I believe there is no record of endemicity, H. imbricata Decaisne, and H. multiflora Blume. During this time frame, Dr. Schlechter (1872-1925) of Berlin, Germany was conducting economic botanical work in the Malay Archipelago, New Guinea and elsewhere (see Flora Malesiana Sect. 1 pp. 470-471 for his itinerary) spent only 2 days, March 4-5, 1907, in the Philippines but described in Latin 9 Philippine hoyas supplied to him by various botanists working in the Philippines at the time. For reasons unknown, there are also 8 unpublished specimens, of which Dr. Schlechter made some very complete drawings. There are 15 herbarium sheets which bear his name, with line drawings of various floral parts. These are of immense value to those who are studying Hoyas of this area. It appears that all descriptions were made from dried or preserved materials, and presumably from data passed

on to him by his mentors. All of these holotype sheets bear the collector's name and some collection data in the lower left corner, with Schlechter's name for the species in the lower right. The species described by him are as follows: H. benguetensis, H. bilobata, H. bordenii, H. gracilis (Celebes), H. luzonica, H. mcgregorii, H. merrillii, H. mindorensis, and H. odorata. These descriptions cover the period 1904-1906. Six of these appear in the Philippine Journal Of Science Vol. 1 supplement 1906, pp. 301-303.

Hoya darwinii Loher was published in Latin in the year 1910 in the Gardener's Chronicle Vol. 47 Jan. 29, page 66 (3rd. Series). E.D. Merrill's Noteworthy Philippine Plants, includes Latin descriptions of Hoya pentaphlebia Merrill and Hoya pubicalyx Merrill. This is to be found in The Philippine Journal Of Science Section C, Botany #5 Sept. 1918, pp. 330-331. In 'The Philippine Journal Of Science' 1920 Vol. 17, pp. 310-311, Hoya cardiophylla Merrill and Hoya reticulata Merrill are described in Latin. The name H. reticulata is untenable due to prior use of the name. E.D. Merrill's An Enumeration Of Philippine Plants, Philippine Is. Science Pub. 18 (1923) pp. 351-354, gives a list of 21 hoya species with their herbaria numbers, collectors, and in some cases other pertinent data, e.g., altitude and\or habitat. Five species are listed as being excluded.

In Leaflets of Philippine Botany (Notes on Asclepiadaceae) Vol. X, Article 131 May 1, 1938 pp. 3572-3591, A.D.E. Elmer describes in English 21 hoya species. The following are not included in previous publications: H. angustifolia Elmer, H. bulusanensis Elmer, H. ciliata Elmer, H. crassicaulis Elmer, H. leytensis Elmer, H. mindanaensis Elmer, H. obscura Elmer, H. pubifera Elmer and H. pulgarensis Elmer. The nine new species described by Elmer in 1938, are all invalidly published as they were described in English contrary to the "International Rules of Botanical Nomenclature".

To regress slightly, In 'Species Blancoanae' (1918) Merrill made up for some of the inadequacies of Blanco's 1837 publication. As a result he came to the conclusion that the species Hoya luzonica Schlechter is synonymous with Hoya meliflua (Blanco) Merrill. The only hoya mentioned in Merrill's 'Flora Of Manila' 1912, is on page 380, and is Hoya luzonica Schlechter. The varietal form of one species is mentioned in Philippine Hoya literature, this is H. imbricata var. basicordata Koorders in Philippine Journal of Science 15 (1919), pp. 263-270 with two full page drawings of the variety. In this same publication Koorders describes a new species in Latin, Hoya pseudomaxima Kds. p. 265. The original pencil line drawings are in the University of California Herbarium at Berkeley, California.

Hoya multiflora Blume is found on a number of Islands in the Philippines including Luzon. It is mentioned with locations by Perkins and Merrill under Centrostemma multiflorum where it may possibly belong.

In 1987, Hoya angustisepela Burton was published in Latin using Schlechter's sheet #10829 as the holotype, making H. mindanaensis Elmer a synonym, but without valid status. At the same time, H. cagayanensis Burton was also published in Latin with Maximo Ramos's sheet #7374 as the holotype. In 1982 a new species, Hoya schallertiae Burton, was named in honor of Mrs. Ruth Schallert, Botany Librarian at the Smithsonian Institute, Washington

D.C.. The holotype for this species is Dr. Edgar A. Mears, without #, U.S. Herbarium #447593 collected 11 March 1904 in the Rio Grande Valley, Seranaya, Mindanao.

Distribution

Hoyas have an Asiatic, Pacific, N. Australian and Oceanic distribution. It ranges from Sri Lanka, India, Borneo and Celebes, Burma, Thailand, Southern China, Taiwan, Indochina, Malaya, Indonesia and Northern and Eastern Australia. From the Philippines, Okinawa, Truck, Ponapae, American and Western Samoa, Tonga, New Guinea, The Solomon Islands, Vanuatu, Fiji and New Caledonia.

Hoya is found throughout the Philippines at all altitudes. With habitat loss comes the danger of specie extinction. The collecting and cultivating of the many species within this genus continues, giving us new insights into specie variation and diversity. Within the past twelve years there has been increased interest in these plants for horticulture purposes, as well as a renewed interest in the taxonomic aspects of the genus.

There are areas of its habitat that have seen only a cursory exploration for collecting and taxonomic study, as well as many areas that have had little or no exploration. If one studies the areas from which collection has taken place, most often a pattern emerges. Collectors, as a rule, will follow a foot path or animal trail through a valley or along a stream course. Another prominent route is up and along a ridge. A collector may strike out from a path in a valley and thence to a ridge or mountain top. Vast regions ideal for speciation to occur, such as isolated and inaccessible canyons, huge tracts of rainforest and jungle are left untouched and uncollected. Logging operations are opening up much of this territory, but even in the Philippines there are areas left for intensive collecting and study.

Monograph

There are 37 hoyas in this monograph. Not included are varieties, e.g. Hoya imbricata var. basicordata, Hoya gracilis var. Philippinensis or other specie variations. I have not resolved synonomy of Hoya crassicaulis Elmer, Syn. of Hoya incrassata, or Hoya reticulata Merrill (an untenable name) Syn. of Hoya incrassata. I am concerned that from the literature and the existing type sheets that are presently available to us, there is not enough evidence to make an accurate determination of these two species. An additional problem is the fact that there is not as yet enough collected live material to determine if these are synonyms, distinct species or true variations. I continue to receive live material from several collectors and am constantly seeing new items that differ markedly from existing species. In attempting to fit these species to existing literature, and with the aid of type sheets to try to determine their correct identification, we must always keep an open mind and look at each specimen from several perspectives.

(1) It matches an existing type.

(2) It is similar, may or may not be correct.

(3) It is not like any other species in the study area.

(4) It is a species from another area.

Another problem we face is the many unidentified, unnamed and undetermined herbarium sheets of Hoya that exist which can run as high as 40-50% of all sheets present. Coupled with this is the mislabeling (incorrect determinations) of many sheets. A complete study to determine the correct labeling of knowns and unknowns, when and if enough material becomes available, will require flowers to be studied microscopically, and could take years to complete. It is hoped that new techniques will be developed or perfected so that we will be able to make determinations chemically, e.g. bio-assays.

It is difficult to collect in many areas of the world at present, and especially in the Philippines. It is my belief that we have not yet begun to collect all the Hoya species in existence. This study is not complete and probably never will be. New insights are constantly presenting themselves, along with the development of taxonomic tools of delineation, such as chromatography and electrophoresis.

I have been particularly interested in the pollinaria as a taxonomic character after reading Dr. Rintz's presentation in the Malayan Nature Journal Vol. 30 (1978). I have a large collection of photomicrographs of pollinaria at 40X and 100X, taken through a Bosch & Lomb monocular scope, and over 1000 photos of various flower parts taken through a binocular scope at 10X and 30X power. A careful study of these photos should lead to new insights as to specie relationships and evolutionary paths. This study is ongoing.

I have made a point of showing all measurements in centimeters (cm.) only. I have given attention to ligules found at the base of the sepals on many species. Anther slots (anther wings) are variable between species and there are variations in the stigmas that need to be noted. The pollinaria are extremely interesting and hold a lot of detail for taxonomic delineations.

We should make an attempt to recollect species from the original type sites whenever possible, to detail fully and more completely the full range of floral characteristics for each species. At present there is more attention being given to the details of the calyx, stigma, and pollinaria than in the past. It is interesting to note the similarities and differences of evidently closely related species. As an example the three species: Hoya pentaphlebia, Hoya sp. 81100 sold as H. merrillii and the Hoya sp. from Cebu. Their leaves vary in appearance, though all three have palmate type venation and light green foliage. All have yellow corollas rolled the same. It is their coronas that are so different, and immediately makes each distinct.

This is only one example of the complex nature of this genus in the Philippines and demonstrates the difficulties in their study. It is easier to gather the literature, translate it, compile it and present it than to key out all the living material and get it correctly identified.
R.D.K.

Climate

Tropical climate prevails throughout the Philippines. It is generally hot and humid at all times of the year. Temperatures are exceptionally uniform, especially when one considers that the island chain extends over 1000 miles from north to south. This is partially due to the insular nature of the nation and thus the modifying influence of the surrounding seas. The mean annual temperature is about 80 degrees F. at the low elevations, where a majority of Hoya species are found, with only a 1 degree F. variation between the northern and southern parts of the country. Differences in altitude do, however, result in marked temperature variations. Several Hoya species have been collected near Baguio in northern Luzon which is situated at over 4,800' elevation in the Cordillera Central mountains. Here monthly mean temperatures are 15 degrees F. lower than those of Manila 130 miles to the south. Seasonal variations in rainfall are also influenced by the mountain barriers and altitude variations.

Between the coldest and warmest months there is generally less than 8 degrees F. differences. Again the greatest variations occur at the higher elevations of northern Luzon. In contrast Davao, Mindanao has only a 2.5 degree F. difference between months. The most noticeable temperature variations are diurnal. The coldest part of the day being just before dawn, rising throughout the morning and early afternoon, after which the temperature begins to fall. In Manila, which is typical of the lowland areas, this variation is about 16 degrees F., or from a low of 75 degrees F. up to 91 degrees F.

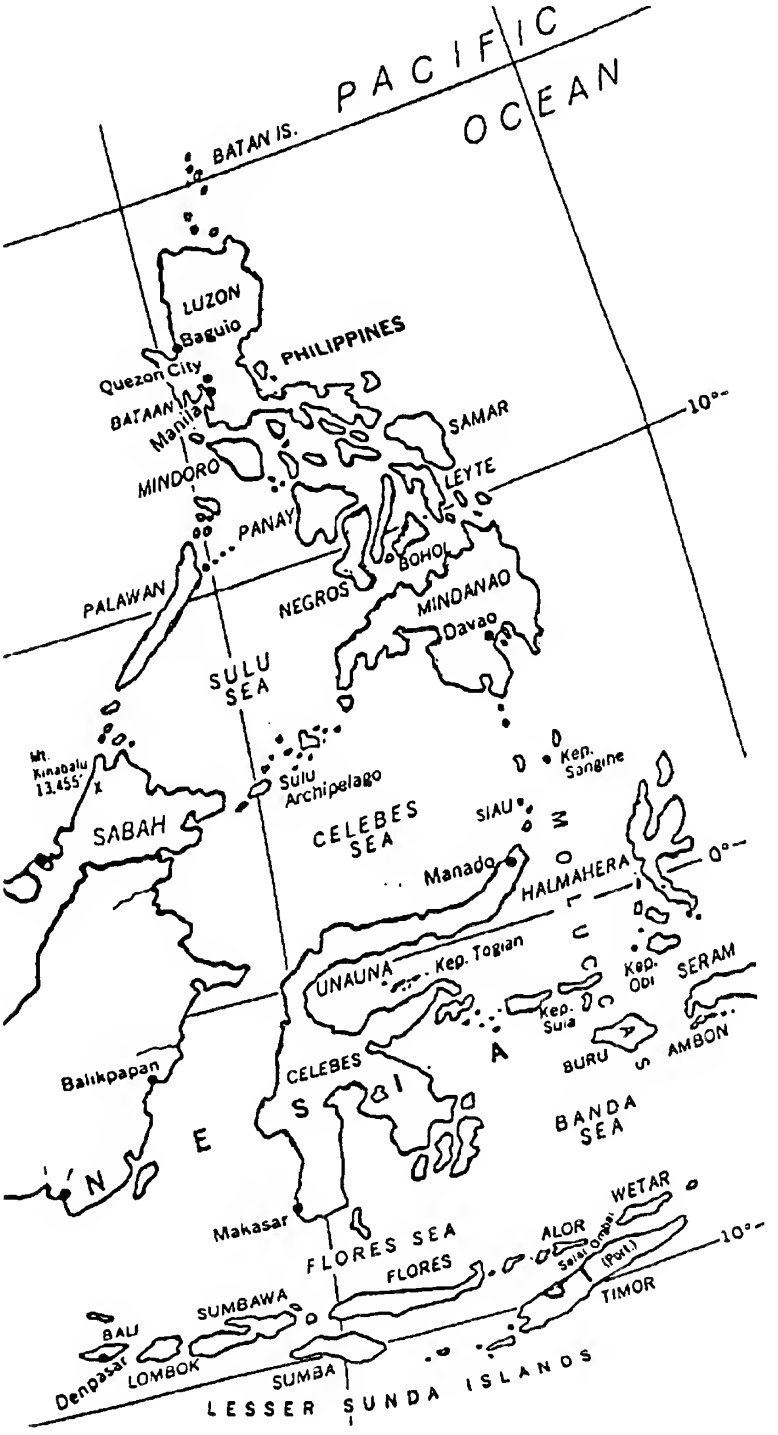
Rainfall is mainly seasonal. There are several monsoon patterns affecting the seasonal storms, with additional cyclonic storm patterns from the south and north Pacific. Most of the country except the east coast has a summer season from April to early June, when it is hot and dry, and with clear skies. The season of heavy rains in these areas occur from June to October and are a result of the southwest (Indian Ocean) monsoons with their warm moist air flowing constantly across the Islands. The mountain faces of the southwest normally receive the most rainfall. The mean rainfall is usually 100 inches or more, with coastal mountains receiving more than 120 inches. The sheltered inland valleys receive 70 inches or less e.g. Cagayan Valley in Luzon and Cotabato Valley near Davao, Mindanao.

During November and December the air movements come from off the cold north Pacific bringing rain to the lower elevations, especially along the east coast. At this same period storms coming in from the South Pacific, from a southeasterly direction, hit the "Typhoon Belt" of Leyte, Samar, Mindanao and intervening smaller islands bringing substantial rainfall.

In the period from January to March the main movement of storms is the cold northeast monsoons originating in Siberia. These strike northern Luzon, bringing cold dry weather to this area during these months. The portion of these monsoons that move over land across China are cold and dry, but the portions that travel eastward over the Sea of Japan and the open Pacific waters bring rain and sweep further down the east coast bringing rain to southern Luzon, the Visayan Islands and Mindanao. These areas along with eastern Luzon are characterized by heavy winter rains and a comparatively short irregular dry period during summer

and autumn. Except for these areas in which rainfall is actually year round, the remainder of the archipelago has a period of drought "the dry season". Undoubtedly rainfall and storm patterns will change with the continued deforestation here, in Borneo, and to the southwest in the Malayan region.

In addition to the above there is superimposed on these patterns, the typhoons originating in the Caroline and Marshall islands that approach the Philippines from the east and may occur at any time of the year. The greatest frequency of these storms that bring considerable rain and destructon is in August.



THE HOYA FLOWER

It has been observed by plant taxonomists that it is the flower and its various parts that show the least variation under environmental influence. As a result of this relative stability, it is the floral parts that are intensely studied and used in plant identification. Vegetative parts, structure and growth habits are also of value but it is the reproductive portions and structures surrounding them that are given most attention. Each character becomes a guide and clue in the final determination. One clue might prove conclusive but it is always best to consider the whole when making determinations. With the tools of modern science, we are adding to our ability to differentiate species. We continue to learn and to have new tools at our disposal.

I will explain the floral parts to familiarize the reader with facts and variations that I have observed from my study of these flowers. I will cover the parts as follows:

(1) The peduncle, pedicel and calyx
(2) The corolla
(3) The corona
(4) The anther appendages and pollinaria
(5) The stigma, ovaries and pods

I will try to give you a hoya species representative of each character I mention so as not to leave you wondering.

The Peduncle

The peduncle is the flower bearing structure or stem that generally arises from the nodes on the portion of the plant's stem between the paired leaves. (i.e. in those species that have paired leaves, a few abort one leaf such as in (H. imbricata Decaisne). It is a structure that is generally slightly smaller in diameter than the node and stem from which it arises. It is usually of the same color and texture as the stem. The peduncle may be glabrous or have varying degrees of hairiness, depending on the species or stage of development. It may develop at about the same time as the leaves appear on the long leafless branchlets in the vinelike species (H. australis R. Brown), or much later from older more mature nodal areas (H. incrassata Warburg). The buds from which they arise lie adjacent to the buds that form the leaf (petiole) and thus do not arise from the center of the stem between the paired leaves but rather adjacent to one petiole base or the other. This is true of branches also. On occasion they may take precedence over the foliage and the leaves may abort leaving the flower stalk isolated on a leafless branch (H. meliflua Merrill). Peduncles can be perennial, lasting for several years or until the plant is stressed (H. pubicalyx Merrill), or they may be produced anew at each flowering (H. nummularioides Constantin). Perennial peduncles bear successive umbel's of flowers. This flowering may be once a year or as often as about every 45 days. The peduncle itself is not a good taxonomic character in specific terms. It varies in length even on a single plant. It can be long straight and filamentous (H. camphorifolia Warburg), or stubby thick and curved (H. rupicola Hill) and all conditions in between. As a structure it is generally smaller at the base and may enlarge as it approaches the rachis (flower

bearing portion). This apex area is a spirally elongated raceme (the rachis) and usually larger in diameter. On perennial peduncles the rachis continues to elongate with each successive flowering (it will elongate even though the flowers abort during their formation as the flowers arise from new meristematic tissue in succession). It is thus possible for the rachis to be longer than the peduncle itself. The rachis can be rough and scaly in appearance or refined and tapered. It can be uniform in diameter throughout most of its length or relatively smooth and tapered into a near cone shape. A single peduncle and its attendant rachis may produce hundreds of individual flowers in its functual life (H. pubicalyx Merrill). In the case of deciduous peduncles only a single cluster of flowers are borne on the peduncle. The rachis may occasionally produce only a single flower or a few (H. pauciflora Wight) or as many as 60 flowers at a time (H. fungii Merrill), I do not know if this is the upper limit of flowers in hoya species or not. This is a complex structure and it should be noted that there are Hoya species and occasional plants that will produce double (divided) peduncles and flower bearing ends. There is one whole group that produce fascilate bundles of pedicles from the meristematic end, often with several adjacent fascicles making up the base of the cluster. These types usually have flower buds that develop at different rates in the umbel (not all at once).

The Pedicel

From the rachis arises the pedicel which bears the flower at its end (one pedicel one flower). The pedicel is very small in diameter compared to the peduncle or its rachis. This can be a diminutive structure of less than one millimeter in diameter and less than 0.8 cm. long (H. bilobata Schltr.) to a fairly large structure, e.g., 8 cm. in length (H. imperialis Lindley). Here again they can be glabrous (H. bordenii Schlechter) or hairy (hirsute) (H. madulidii Kloppenburg). They may vary in length within a single umbel (0.2 cm. to 5.0 cm. in H. revoluta Wight), and it is this variation that determines the shape of the flowering cluster. Dr. R. E. Rintz author of "The Peninsular Malaysian Species of Hoya" recognizes 3 types of clusters. (1) Geotropic concave umbel (H. lacunosa Blume) (2) Geotropic convex umbel (H. multiflora Blume) (3) Negative-geotropic convex umbel (H. acuta Haw.). There are some essentially flat umbels I would call Geotropic flat (H. bilobata Schltr.). Many pedicels are rigid and maintain the flower in a given position. A few are flexible (H. campanulata Blume). They may also succumb to the weight of the flower (H. multiflora Blume). In globose flower clusters the inner flowers bear the weight of the outer ones, relieving weight stress on the pedicel (H. pubicalyx Merrill). The negative-geotropic flower cluster is a result of the peduncle lying in a horizontal position, the pedicels are rigid and do not respond to gravity; each flower is slightly free of its neighbors (H. acuta Haw.).

The Calyx

This entire structure is the first whorl of flower parts, just below the corolla (petals). It emerges from the enlarged end of the pedicel. It is an insignificant looking structure, often overlooked , but a good taxonomic tool. Its lobes (5) may be of various shapes, but relatively uniform within a species. Its lobes (sepals) may be long and narrow (H. angustisepala Burton) and variations in-between, from short and squat to almost round (H. meliflua ((Blanco)) Merrill. They may be individual, barely overlapping (H. pentaphlebia Merrill) or may overlap to a large degree (H. madulidii Kloppenburg). The outside surface may be glabrous, punctate, granulose, or hairy (pubescent, puberlous, hirsute, velutinous, tomentose etc.), or only the edges may have cilia(ciliate). The inside is, on all hoyas I have examined, glabrous and usually smooth-shiny, waxy or wet in appearance. The edges are often thin

(membranaceous). The central area may be thickened or remain thin in some species. One can often see linear veins through the inner surface. This inside surface may be concave, nearly flat (H. obovata Decaisne), or reflexed, and thus convex, to accommodate the shape of the corolla (H. odorata Schlechter). As you can see there are a lot of characters here to delineate, observe and study. There is one more floral structure here that I call a ligule (tongue). At the base of and at the junction of the sepals there is often this little protuberance. I have not yet determined if it possesses taxonomic value, but this is what I have observed. I am attempting to determine if the character is constant within a species. Ligules may be exceedingly small (H.obovata Decaisne). Two ligules at each space (H. nicholsoniae Mueller); ones varying in number (2-1-2-1-1 configuration)(H. multiflora Blume). They may remain as small discreet structures or may grow in length, one or two, and not uniformly as I have observed in H. pubicalyx Merrill or H. kenejiana Schlechter; or no ligules (H. madulidii Kloppenburg).

The Corolla

The petals of the hoya flower are fused into a cone at their base, with 5 free lobes (termed the corolla). The first whorl of floral parts consists of the calyx and the second whorl is the corolla (the perianth =the first two floral envelopes). The flowers may open all at the same time (most hoyas) , but there are a number that open in succession. The umbel will contain flowers in various stages of development from fully open flowers to tiny buds just starting the developmental process (H. meliflua Merrill). Species that open in stages are particularly favorable for the study of the origin of the flower parts. The hoya flower is described in botanical literature as being 5 merus and radially symmetrical, with valvate aestivation. To elucidate, "aestivation" was a term introduced by Linnaeus for the arrangement of parts of the calyx and corolla in the flower bud. "Valvate" is where the parts touch along their margins, without overlapping. There are 5 petals fused to form the corolla "5-merous" and they spread out uniformly from a common center "radially symmetrical". So if we look at a hoya bud we can see the outside surface where the free portions of the corolla (its' lobes) meet "valvate". As flower opening begins it parts at this line and unfolds into the characteristic pattern of each species being observed. At the end of the flowering period many species fold their corollas back to bud form and then drop off (the process of closing is not quite complete).

The corolla lobes alternate with the lobes of the calyx (sepals) below, and the corona lobes (scale) above. Each sepal apex points to the cleft in the corolla as does the outer apex of the corona scale. The flower goes through a process of developing, opening, unfolding, reaching a static state, maturing and dropping. The corolla is usually large , but as we know highly variable in shape, color, texture, size and orientation among the various species. In shape it can be urceolate (H. heuschkeliana Kloppenburg), campanulate (H. campanulata Blume), flat (rotate) H. pubicalyx Merrill, recurved (H. darwinii Loher, or revolute (H. obscura Elmer ex Burton) and most intermediate types. The inner and outer surfaces may be glabrous, smooth, rough with punctations, granulations, with (fuzz) puberlous, pubescent, hirsute, etc. and most often waxy to some degree. The two surfaces may be alike, but more often they are different in texture. It is all these and many more differences that make good taxonomic characters with which we can attempt to dileanate species. In addition to texture, the corolla edges may be rolled under to different degrees and configurations. The tips may roll

under, curve up, or lay straight out. The whole corolla surface may be recurved or even revolute or as we said before campanulate or rarely urceolate or uncinate. This gives each species a characteristic appearance.

The color of the corolla may be due to pigments dissolved in the fluid of the cells or to pigments contained in chloroplasts and a combination of both in some cells. The colors dissolved in the cell fluid are generally anthocyanin pigments. These give rise to our red, purple and deep colored flowers (H. benguetensis Schlechter). This color can change with different environmental conditions at the period of development and with the age (maturation) of the flowers. The change is often the result of a change in the acidity within the cells. The chloroplast pigments are usually carotene and are responsible for the yellow (H. nicholsoniae F. Mueller), orange, rose and even some red colorations of the corolla. Corollas that are white have no color pigments exhibited. Intensely white corollas (H. bella Hooker) are due to the reflection of light from the densely packed air filled ciliated cells on the inner corolla surface.

If you will study a cross sectional photograph of a hoya flower, you will see that the tissue of the corolla arises from an area just inside the calyx. The tissue appears to be continuous and uniform. In horizontal section, however, there are vascular tissue strands revealed, tissue that furnishes nutrients for formation and life of the structure. This tissue appears to continue on up to form the inner structure of the complex corona lobes (staminal in origin). I have not seen a study on the cellular structures of the hoya flower, but I can draw a few conclusions from observations. It is logical to assume that since the corolla and corona are deciduous (drop at maturity), there is at least a cell differentiation at the area of connection with the pedicel. By pulling gently on the corolla it separates from the pedicel leaving behind the calyx and usually the ovaries. In a few cases the ovaries will remain with the corolla and corona. It is more difficult to separate the corolla from the corona and stigma, however, it can be done. It separates, leaving a collar (part of the corolla) and of course an empty circle in the middle. The surfaces of epidermal cells is continuous and made up of cells with convex tops. In the case where hair like cells are present they arise from the center of such cells and are themselves hollow. There is also the characteristic layer of wax that give hoyas their common nickame of "wax plant".

The thickness of the corolla varies widely in the different species. It can be very fleshy and thick (as in H. affinis Hensley and related types), to the tiny delicate corollas (such as in H. bilobata Schlechter). In this context one other species should be mentioned, Hoya camphorifolia Warburg with its thin corolla that stays open only hours or a day. It seems that the more fleshy types have the best lasting qualities.

Taxonomists , in their attempt to develop natural and understandable systems of classification are constantly redefining and changing older systems in part based on what they feel is significant. There are those who are "splitters" who wish to divide plants one from the other based on only 1-2 differences. Then there are "lumpers" who want to group into a single entity all plants that are similar. Between the two extremes there are taxonomists who adhere to varying thoughts as to what is and is not significant. At various levels an individual may be "splitter or lumper" . Dr. Ken Hill author of "A revision of Hoya in Australia" has

recently (1988) suggested the removal of all the Eriostemma species of hoya to a new genus "Eriostemma". He bases this on a number of "key diagnostic characters" that are different in other Hoya species.

H. multiflora Blume has been in and out of the Hoya genus over a long period of time because of its uniqueness. With the discovery of Hoya heuschkeliana Kloppenburg by Professor Juan Pancho of The University of the Philippines at Los Banos, we have a characteristic urceolate corolla that differs from other corolla types in the genus. This species is not a singular instance. Schlechter had named an unpublished plant, H. intermedia found in 1906 by W. J. Hutchinson at Mindanao, Zamboanga province in the southern Philippines. This is another urceolate corolla type which differs from H. heuschkeliana Kloppenburg in its rounded sepal apex and longer bilobed extensions of the outer corona lobe. In addition there are some campanulate types that closely approach urceolation. (H. vacciniiflora Schwartz; H. rhodostemma Schlechter). There is also a sheet with urceolate flower #29828 by Clemens from Mt. Kinabalu, Borneo. This group could lead to the formation of a new hoya section.

The Corona

The corona encircles the gynostegium, the union of the stamens with the fleshy stigma head at the center of the flower and of great importance to the taxonomist. This is a very prominent feature of the hoya flower. It consists of 5 scales, each with an inner and outer projection. It lies above and outward from the anthers and stigma. The scales are thick and fleshy for the most part, and between species, shows great diversity in size and conformation. Within the hoya genus there is an almost endless variation exhibited in this structure. The tissue arises from inside the calyx and corolla forming a column, the staminal column. The tissue forms an almost continuous structure with the corolla, anthers and stigma. The staminal column can be extremely short, H. darwinii Loher , H. ciliata Elmer ex Burton or very long as in H. madulidii Kloppenburg. In this latter species the column is glabrous, in H. affinis Hemsley it is covered with silky white hairs. This column covers most of the pistil's surface. It is composed of spongy cells and moist in the living state. From around the base of the corona scales the nectar of the flower is secreted. What we see when viewing a living flower is this outer surface glistening up at us, distinctively shaped and sculptured in each species. The inner lobe of the corona scale, although highly distinctive and variable between species, is usually a short conical projection and lies just above the base of the triangular apex of the anther (anther appendage). The outer lobe by contrast is usually larger, fleshy and more variable in form. In many species its edges are curled under to form a void and thus a channel down this lower surface. In some botanical descriptions this is referred to as "longi tudinally pitted"; also as "sulcate". It is not really a channel but a space left between the curled edges of the outer lobe. It is a good taxonomic character as there are species which lack this structure, such as H. obscura Elmer ex Burton or modified as in the Eriostemma section . I would like to add that when I refer to the variations in the corona I am thinking of variations among the various species. There seems to be very little variation within a species. It is the stability within this structure and its visual prominence that has lent itself to stable taxonomic description.

Taking one surface at a time: (1) The inner lobe, (by some authors referred to as the upper lobe, although it can be equal in elevation to the outer lobe or in many cases even lower) can be very diminutive. H. bordenii Schlechter, with hardly a projection at all. It can

project inwardly to even touch the other inner lobes of the corona, H. darwinii Loher. In addition this lobe can be thick, thin, rigid or flexible. In H. gracilis Schlechter, it is relatively thin; in H. burtoniae Kloppenburg, it is rigid, almost like the husk on barley or the covering on popcorn. In a few species I have examined, this inner lobe appears to be of a different cellular structure from the bulky central portion and the outer lobe. (2) The upper surface may contain an umbo (a little dome or knob) at any position. It can be nearer the inner lobe or the outer and occasionally near the center, H. meliflua Merrill, it is common on most dumpy short round outer lobed coronas. This surface can be concave, H. kerrii Craib, or convex H. archboldiana Norman. It may have a longitudinal ridge down its center, H. benguetensis Schlechter. (3) The outer lobe and apex may be blunt and broadly rounded, H. diversifolia Blume, pointed, H. mindorensis, Schlechter, elongated, H. bordenii Schlechter. It can be straight, H. acuta Haworth, curled upward, H. merrillii Schlechter, or turned downward, H. angustisepala Burton. (4) The side surfaces of the coronal scales may be smooth and rounded or may be sculptured in various ways and have extended projections, H. gracilis Schlechter. This gives rise to the section Acanthostemma. (5) I have mentioned the channeling of the lower surface and the lack of same in some species. In addition there are intermediate forms, H. madulidii Kloppenburg, and this surface can be grooved, lined, or smooth.

This whole structure can slope upward from the outer lobe toward the center of the flower, H. bilobata Schlechter, at a steep angle (the inner lobe much higher than the outer) or it may be horizontal, H. benguetensis Schlechter, or the outer lobe may be raised and higher than the inner lobe as in H. camphorifolia Warburg and as in H. merrillii Schlechter, it can be saddle shaped. The scale can appear translucent, H. benguetensis Schlechter or opaque as in H. meliflua Merrill. Note the pagoda shaped crown in H. caudata Hooker f., the straight outer lobe of H. neoebudica Guillaumin.

Color is not a good taxonomic character and few hoya descriptions elude to it in their descriptions. I'm sure hoya growers, however, notice the color in their flowers and that the coronas are variously colored. Many coronas are all white or cream colored, H. australis R. Brown, or H. longifolia Wallich. A large group are bicolored or tricolored, the inner and outer lobes being of different colors. Quite often red and white, H. acuta Haworth or red and yellow, H. diptera Seeman. In some species the color is solid, H. benguetensis Schlechter which is red, green in H. odorata Schlechter and translucent red in H. bella Hooker as mentioned before. It is often found that within a species there appears color variations, and so the unreliability of color in identifying species. Note the various color forms of H. acuta Haworth and the green forms in H. macrophylla Blume and other species. The color will vary depending on the weather conditions, mainly temperature under which the flower develops which effects the acidity within the cells.

I have not covered all the possibilities - each species is unique. With two ends, a top, bottom and two sides the possibilities of variation are endless and nature seems to have exploited most of them. This structure alone gives the taxonomist a valuable means of differ entiating species. Within a species it is fairly consistent and constant and as such has been of prime taxonomic importance. In dried herbarium specimens the corona being succulent loses moisture, shape and color, yet it can still be used to aid in the identification of species.

The flowers can be boiled up or as Professor Juan Pancho at the University of the Philippines showed me, one can use the "Kew" solution to accomplish the same objective of restoration.

The Anthers

In the hoya flower the androecium consists of 5 stamens whose filaments are fused to form the column. Each anther is roughly a triangular flat shield with two anther sacks or "pockets" to hold the pollinia. The upper edges of this triangle culminating in the apex are hyaline and cover the stigma head to varying degrees. The sides cover the retinaculum. This hyaline edged structure lies just below a coronal scale and is fused on its inner upper surface to the inner scale surface and its lower surface is fused to the underlying column. On this lower side of the triangle there is a thickening of the tissues in from the hyaline edge, also triangular in shape, giving rise to two"pockets" in which the pollinia rest - one "pocket" on each side of the thickened triangular area.

The apex of the anther, the "anther appendage" may be extremely long and overtop the stigma head in the center as in H. fungii Merrill or even have modified filamental extensions as in H. archboldiana Norman. In H. cumingiana Decaisne it also exceeds the inner lobe but in the densifolia form the anther appendage is equal in length to the inner lobe of the corona scale. This anther appendage may be membranaceous and flexible or in a few species very rigid and horny in texture.

Each triangular anther is modified along its lower edges to form the "anther wings". The edges are thickened and corneous. These corneous margins of two adjacent wings meet in a flat linear surface. The tissue making up the modified anther edge is usually opaque , waxy and yellowish in appearance. The adjacent wings and the underlying tissue in the form of a trough form a slot leading upward and/or inward to the stigmatic receptive area. It reminds me of an avenue to an amphitheater –very small I assure you. Even in the largest hoya flowers the concave receptive area will not accommodate the head of a straight pin. In H. incrassata Warburg the anther wings are narrowly keeled and scooped out on either side similar to the keel of a boat. In H. benguetensis Schlechter the winged edges are swollen, rounded and prominent and rise noticeably above the surrounding tissue. There is a further modification of the anther wings, a doubling of this corneous material, as in H. imbricata Decaisne. In a herbarium sheet #49395 labeled H. fischeriana, I have found even further modification of the wing into a double ridge separated by a flat area, shield shaped in outline, extremely prominent and visually noticeable. In H. plicata King & Gamble the wings are very narrow, almost covered and compressed by the side lobes on the corona scale. I mention these variations because I feel they have been largely overlooked in taxonomic work, and because I feel they are significant and should be noted. In a few cases they may hold a key to easy identification.

The Pollinaria

There is confusion in the terms designating the parts of the pollinia (pollinaria) and with some modification I prefer to follow Dr. Schlechter's terminology. There are structures evident that as yet are unnamed or loosely covered by an all inclusive designation. My usage

for now is as follows. Pollinium (singular) Pollinia (plural): the pollen sack containing the pollen grains. Pollinarium (singular) Pollinaria (plural): the structural unit of two pollen sacks and their attendant connected structures. The two pollinium are connected by "translator arms" to a dark colored horny structure the "retinacula". The retinacula is visible as a dark spot between the corona scales. The term "caudicle" has been used to refer to that portion of the translator that remains attached to the pollinia if they are forcefully separated. The retinacula is sometimes called a corpusculum and I prefer not to use this term for this structure.

Each anthers 2 "pockets" holding pollinium from different pollinia pairs. Put another way, the pollinia from each retinaculum are housed in adjacent (different) anthers. The retinaculum is secreted as the flower is developing from an underlying gland. It appears to form after the pollinia, as in some unopened flowers it is still in a viscid state when observed. The Pollinaria in hoya are highly varied in shape, size, type of appendages and their extent. I would say that each pollinarium is individualistic and if you were familiar enough, or had drawings or photos of each, it would be possible to identify species through this structure. Taken along with the other floral structures, it is of great taxonomic significance. It must be stated that the pollinaria in the genus hoya are reversed to those in many other Asclepiads. The retinaculum is below the pollinia. In many drawings it is depicted as it sits in asclepiad species in general, actually reversed as to the way it structurally lies in this genus. It seems to me it should be depicted as it is and not upside down. There are group similarities and I am working to determine if each grouping follows the sectional designations already established. In the ereostemma section the pollinia lack the keel on the outside edges of the pollinia as do the dischidia pollinia. The ereostemma section also has long twisted translators. In the acanthostemma section most if not all of the translators have extra material called wings but also some clear membranes that extend out from the retinaculum. In some species like H. incrassata Warburg the retinaculum is clean. The retinacula can be long, short, thin or fat and dumpy. H. camphorifolia Warburg has the later type whereas H. pubicalyx Merrill has a long rather slender retinaculum. The same variations can be found in the pollinia. This is one structure that does not seem to be effected by time spent on a herbarium sheet. I have examined the pollinia from sheets collected in the early years of 1900 and if removed carefully appear to be as new, not shriveled or deformed in any way. This lasting quality makes it extremely valuable in our quest to identify present day collected material.

The Ovary

The ovaries of hoya are in pairs above the calyx ring, and surrounded by the staminal column. In cross section the ovary is hemispherical. The two together are like a circle cut in half, each half forms the cross sectional view and they meet at the flat plane. In vertical view they are like little fingers. They are mostly waxy in appearance and moist. Most are lime green in color, some yellow, and in Hoya carnosa, Hoya motoskei, and Hoya fungii they are a beautiful red color. In Hoya archboldiana the lime green base is topped with a plum red apex. Very colorful.

The descriptions of most hoyas do not mention the ovaries, however a few have been described as urn shaped etc.. They are rather insignificant and certainly very small, however I feel that if a classification system were developed for them, they could be useful taxonomic tools. Ditto for the stigmas. There are similarities in ovaries among related species and vice versa ovaries could be used to establish relationships, also the stigmas.

There are long columnar types of ovaries as in H. darwinii Loher, with its rounded apex, and exceeding the sepals in length. In H. multiflora Blume they are also long and narrow and in some varieties they are shaped like bowling pins- in which case there may be more than one species involved here. In H. camphorifolia Warburg the ovaries are only about 1/3 as long as the sepals and those in H. obscura Elmer ex Burton could be described as short and dumpy. In H. micrantha Hooker f. the ovaries are slim and long, almost two times the sepal length. Nearly all ovaries are glabrous and smooth, however in the hoya species WMZ, on the inner surface where the two ovary pairs meet, there are projecting stiff cilia. I am trying to point out that here again in the genus Hoya there is a vast array of variable structures, and it is again exhibited in the ovaries.

The pollen tubes enter from the apices of the ovary and fertilize the ovules within. After fertilization a pod (follicle) develops. Two pods are possible for each flower in an umble. Most of the time only one pod develops from the two ovaries. In favorable conditions however an umbel may give rise to a whole cluster of pods. The ovaries grow to maturity rather rapidly and usually are mature and burst in two to three months. In most hoya species the pods are long and slender and either curved or straight, less than a centimeter wide x 3 to 6 inches or so long. In the eriostemma section the pods are usually large, like thick Polish hot dogs. At any rate they are hundreds of times larger in diameter than their smaller counterparts but only slightly longer. When the pod matures it splits longitudinally from the apex toward the point of attachment, revealing the rows of imbricate brown flat seeds. Each seed is attached to its folded parachute, a silky tuft of hairs (the coma). As the pod dries the comose seeds are freed from the placenta and wafted off by the slightest breeze.

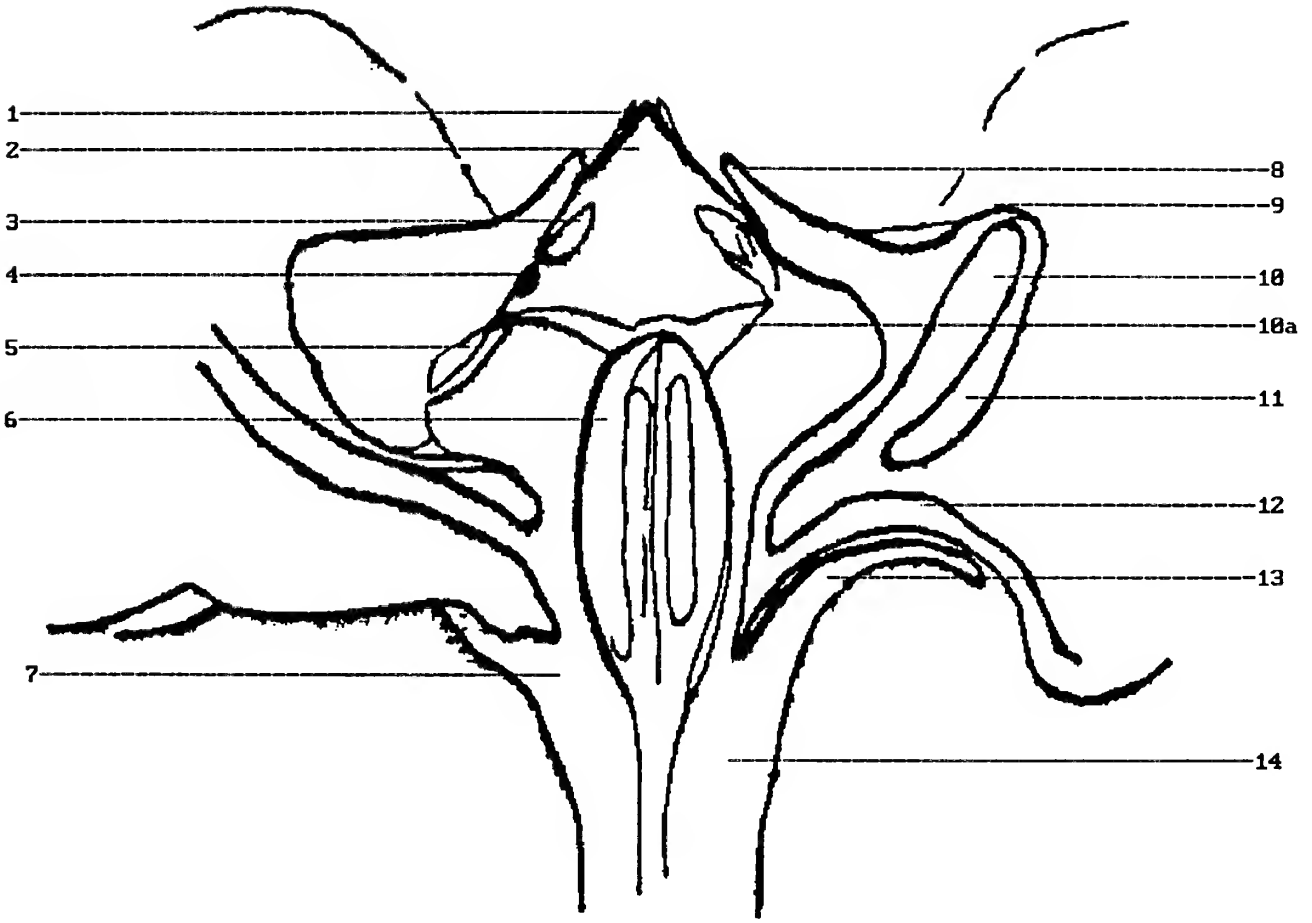
The Stigma

Little has been written concerning or describing the stigmas of hoya. In recent publications neither Dr. R.E. Rintz nor Dr. Ken Hill discussed them. Christine Burton is the only recent researcher that I know of who has recognized the variations in the Stigma/Styler material and their possible taxonomic significance. Strictly speaking the stigma (the receptive area) is very small, a somewhat concave surface under the retinaculum. Its surface is granular and spongy in appearance and tissue leading from the area (styler in origin ?) is of similar consistency. It forms a curve leading to the apex of the ovaries. The remainder of the styler material which we usually refer to as the stigma or stigma head, is the showy part, and modified in intricate ways. Some I think of as simple and primitive, others as complex and maybe evolutionally more advanced. (Here again a system of classification or categorization would be useful).

In the H. species WMZ the "stigma head" is shaped like a 22 bullet, a round topped short column. In H. cumingiana Decaisne it is ornately capitate, lobed with a concave conical base and rusty red in color. Most hoya stigma heads I have observed are white in color. All the base areas of this head are five sided with rounded or scalloped connecting tissue in be-

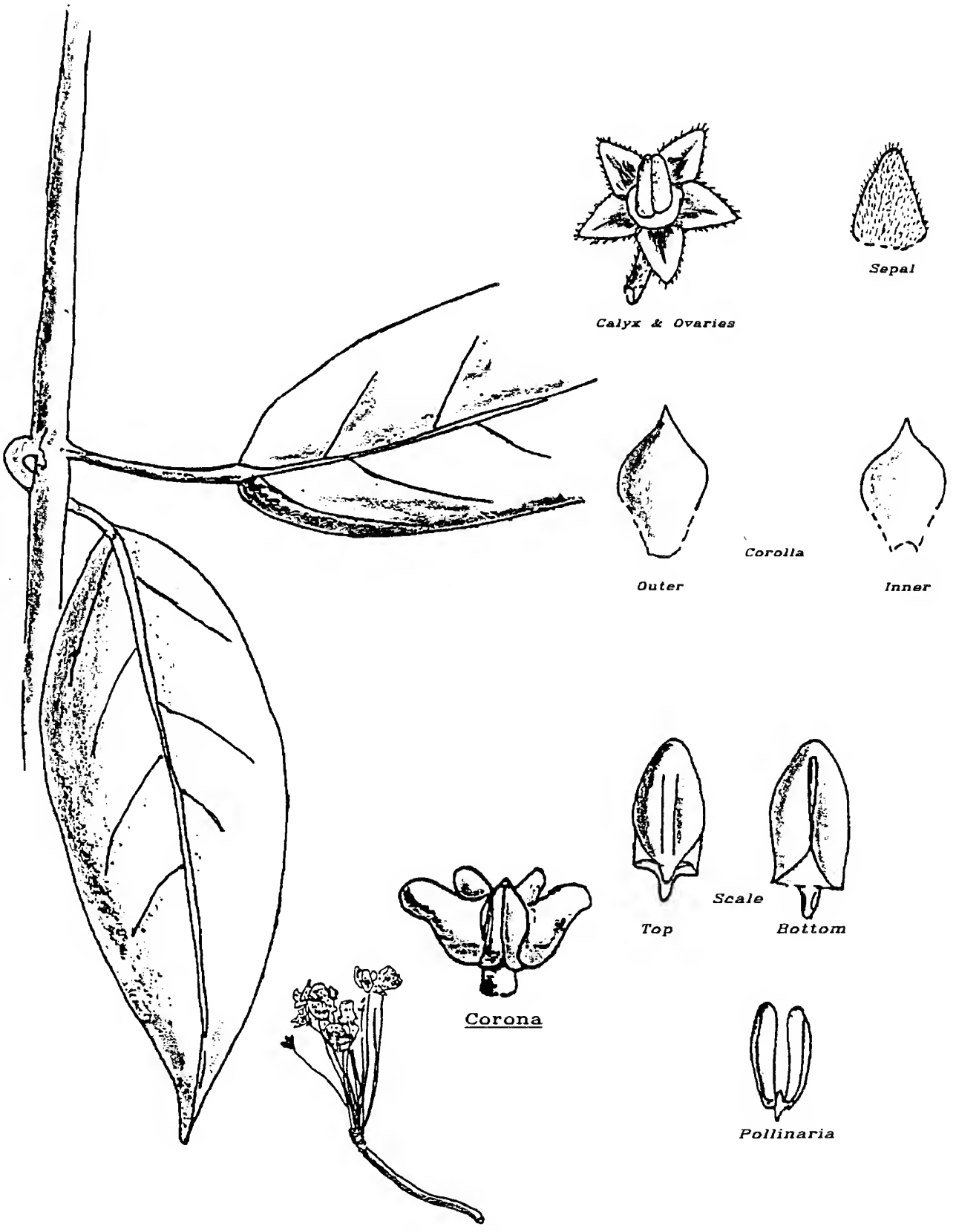
tween. The five angles are usually thickened, some bilobed and from this base the conical (etc.) head arises. In H. obscura Elmer ex. Burton, the head is cone shaped the sides linerally lined with a smaller granulose cone topping the larger base cone. I could point out numerous distinct, and to me, beautiful variations of this structure. I wish only to show you that there is here again a lot of variability and some groupings of similarity also.

Hoya Flower In Cross Section



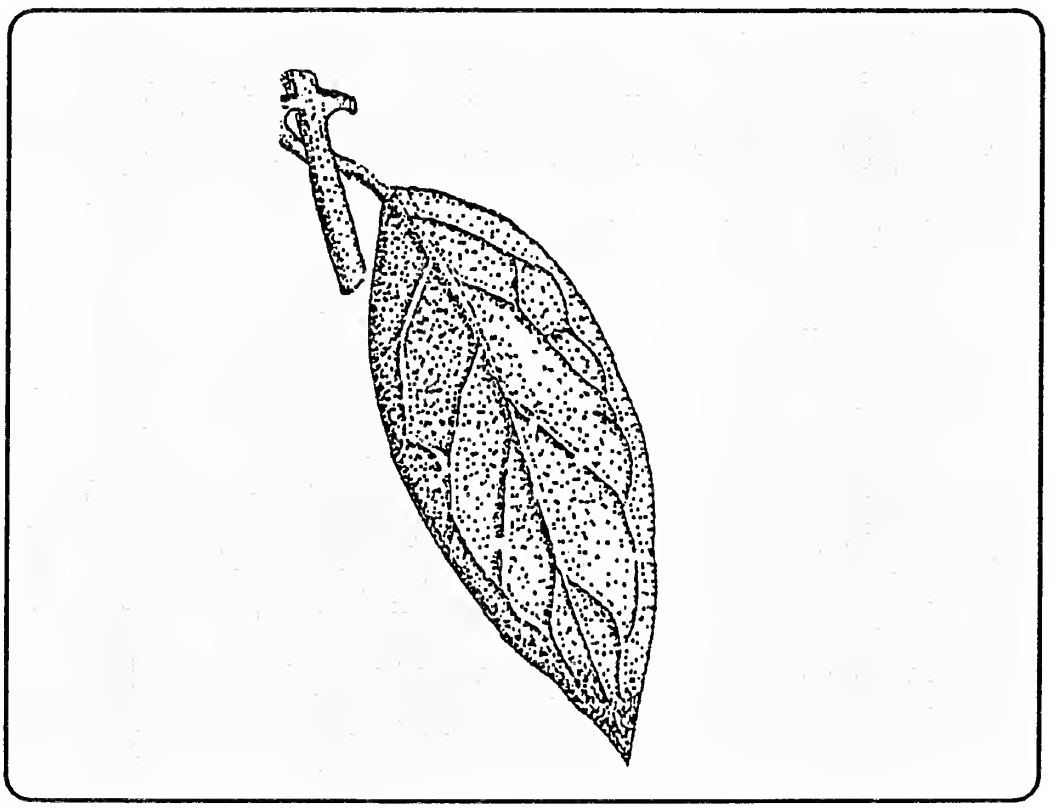
Hoya in cross section: 1)Anther apex or appendage. 2)Stigma. 3)Pollinium. 4)Retinaculum. 5)Anther wing. 6)Ovary. 7)Calyx base. 8)Corona scale inner lobe. 9)Corona scale outer lobe. 10)Hollow formed by corona sides curling under. 10a)Stigmatic receptive area at end of channel. 11)Corona curled under to form channel. 12)Corolla. 13)Sepal. 14)Pedicel.

Tracings from Schlechter's H. alagensis sheet #5542 Collected by Elmer D. Merrill November 1906 on the Alag River, Mindoro, Philippines.
By Dale Kloppenburg 1990

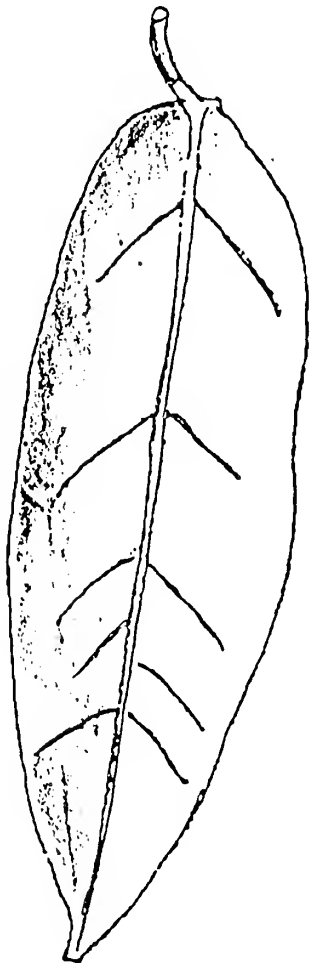


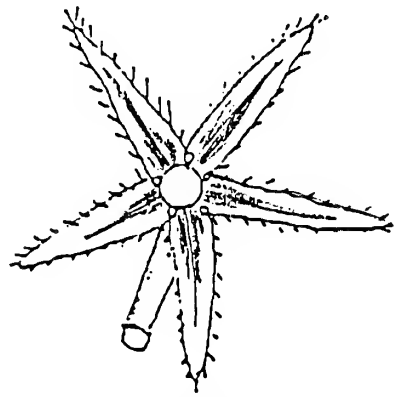
Hoya alagensis Kloppenburg in Fraterna Vol.1 3rd. quarter 1990. Type #5542 (B) found by Elmer D. Merrill on the Alag River, Mindoro, Philippines Nov. 1906 in the forest at 150 m. Flowers purplish and odorless.

A twining climber 6 m. or more long, branches terete and glabrous, somewhat fleshy and large. Leaves outspread with rather curved, long glabrous petioles (3 cm. x 0.2 cm. in diameter), ovate lanceolate, bases somewhat rounded, apex sharply acute to rostrate,11 cm. x 4-5.5 cm., not carnose, 4-6 veins on both sides of the midrib, ascending, reticulate, costa prominent on the under side, straight. Peduncle 4 cm. long, glabrous 0.2 cm. in diameter, perennial, enlarged toward the rachis, which is enlarged, 0.4 cm. in diameter. Pedicels filiform to 5 cm. or more long. Calyx segments hirsute 0.3 cm. long, slightly overlapping at the base, ovate obtuse with ligules present. Corolla broadly ovate with acute to apiculate apex, deeply lobed. Corona scales above ovate in outline, inner apex shortly beaked, outer apex rounded with a longitudinal ridge on top, not fully channeled below. Pollinaria with long narrow pollinia, short translators and a small narrow retinaculum. Key #30



Hoya angustisepala Burton Originally published as Hoya mindanaensis Elmer Sheet #10829 June 1909, Todaya Mt. Apo Mindanao, Philippines.
By Dale Kloppenburg 1990



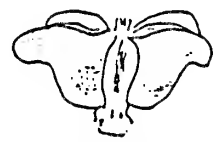


Calyx

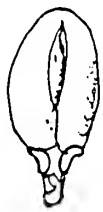
Sepal

Outer

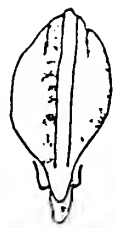
Inner



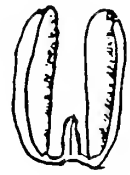
Crown



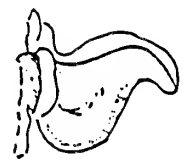
Ventral



Dorsal



Pollinia

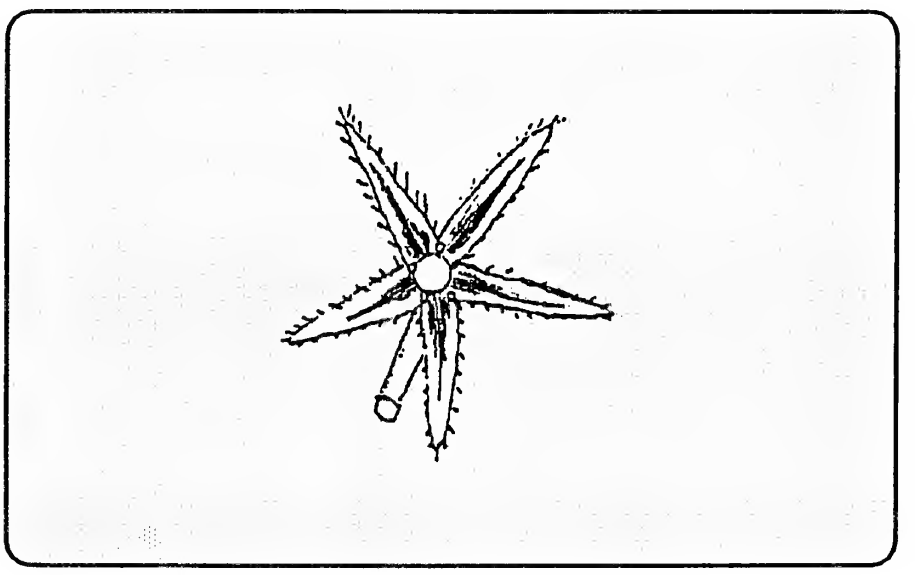


Scale

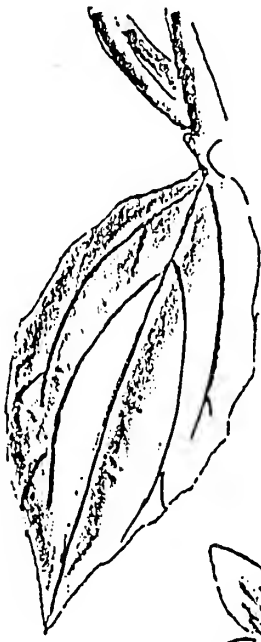
Hoya angustisepala Burton in Hoyan #4 Vol. 8 1987 part 2 a,b. Syn. H. mindanaensis Elmer, (B) Leafl. Philip. Bot. p. 3584 (1938). Type: Elmer #10829 (Schltr.). Discovered in the woods along the Subulan River at 3000' altitude, Todaya (Mt. Apo), Davao, Mindanao, June 1909. US & Mus. Berol.

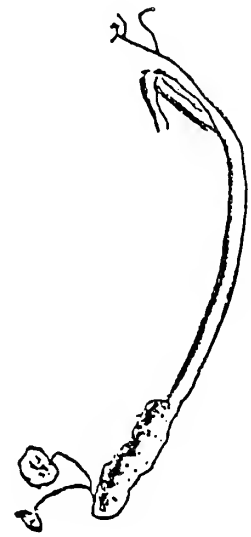
A branched vine. Stems terete flexible, glabrous, smooth, up to 0.7 cm. in diam.. Latex present, occasionally twining. Leaves opposite, persistent, scattered, thickly coriaceous, mostly descending. Tips recurved, otherwise flat, entire margins slightly imbricate, glabrous and smooth, oblong or more often oblong ovate. Base broadly rounded, leaf tapering into the acute to subacuminate tip. Blades 8.5-13 x 5.6-6.5 cm.. Midrib thick and pronounced below, grooved and visible above; extending to tip, penninerved, 3-6 on each side, mostly alternate, reticulate. Petioles to 2 cm. in length, thick 0.2-0.4 cm. in diam., curved, glabrous, grooved above. Peduncles arising at the nodes from above, terete, descending with a few short hairs, becoming glabrous, minutely ridged and tubricled lengthwise, 8-12 cm. long. Pedicels umbellately spreading, to 5 cm. in length, terete, filamentos and glabrous. Sepals very linear 0.5- 0.75 cm. long, minutely puberulent, spreading, one ligule present at each sepal connection. Corolla broadly ovate, tip narrowly acute, reflexed with apex rolled inward toward pedicel. The sides thus appear as horned lobes, finely tubricled on the outside, inside with a yellowish gray tomentome, united toward the adnate base to form a short thick column. Flower 2-2.5 cm. in diam.. Corona ascending, rigid, top is concave, outer lobe blunt, recurved; inner lobe curved upward and narrow with small projections from under each side, scale thick and chunky, channeled beneath, anther appendages exceeding the inner lobe. Key #28

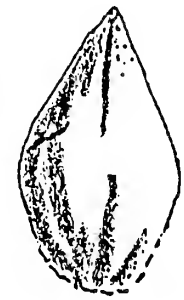
Ramos & Edano #43947 Tawitawi, Sulu, Philipp. Aug 1924. UC



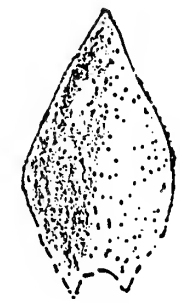
Hoya benguetensis Schlechter Type #5979 Elmer March 1904 Benguet Luzon, Philippines.
By Dale Kloppenburg 1990



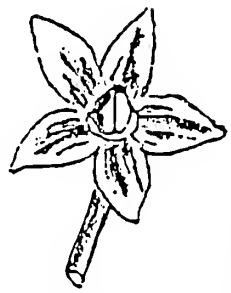




Outer



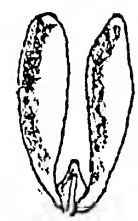
Inner



Flower

Sepal

Crown



Pollinia

Scale

Dorsal

Ventral

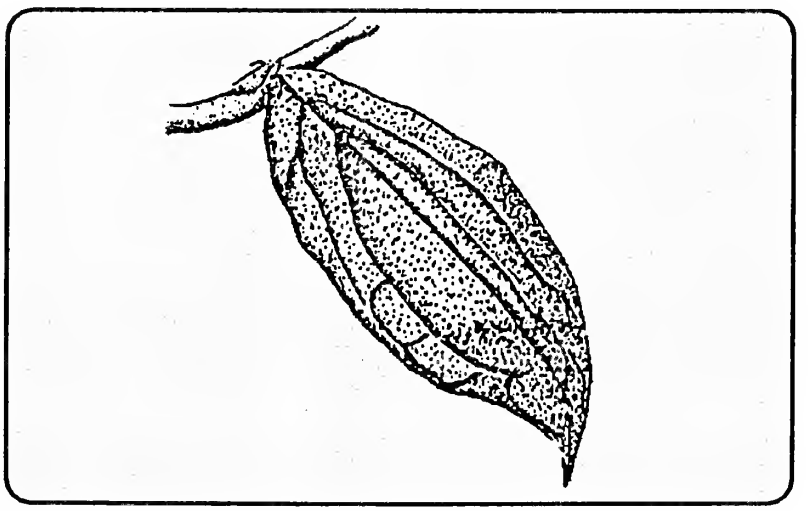
Hoya benguetensis Schlechter in Philippine Journal of Science 1st supplement, page 301 (1906). Type: Elmer #5979 (B). Discovered at Baguio, Benguet Province, Luzon Philippines. March 1904

A branched epiphytic, twining climber, stalks, filiform and flexuose, terete, glabrous 0.3 cm. diam., internodes 9-15 cm., loosely leafed. Leaves elliptic or ovate-elliptic, acuminate, glabrous and thickly coriaceous; with 5 conspicuous primary nerves. Triplinervis. Leaf 6-10 cm. long, 2.5-4 cm. wide at middle or below. Petiole short and fleshy, 0.5-0.8 cm. long. Inflorescence umbellate; many flowered. Peduncle total length up to 7.5 cm. long. Pedicels filiform, glabrous, 1-1.3 cm. long. Flowers red (rubidus), medium sized. Calyx ovate, obtuse, glabrous, 0.2 cm. long, 1 ligule at juncture of each sepal. Corolla partially reflexed, outside glabrous, inside very minutely farinose-papillose, about 1 cm. in diameter; lobes broadly ovate acute 0.3 cm. long. Corona horizontal apexes obtuse, beaked and stretched out inward, keeled above, channeled beneath, back obtuse. Pollinia obliquely clavate, translators small, retinacula rhomboid. The "Igorots", (natives of the area) have named this "Umum" (home of the ants). In thickets or forests at an altitude of 1,200-1,600 meters. Key #13

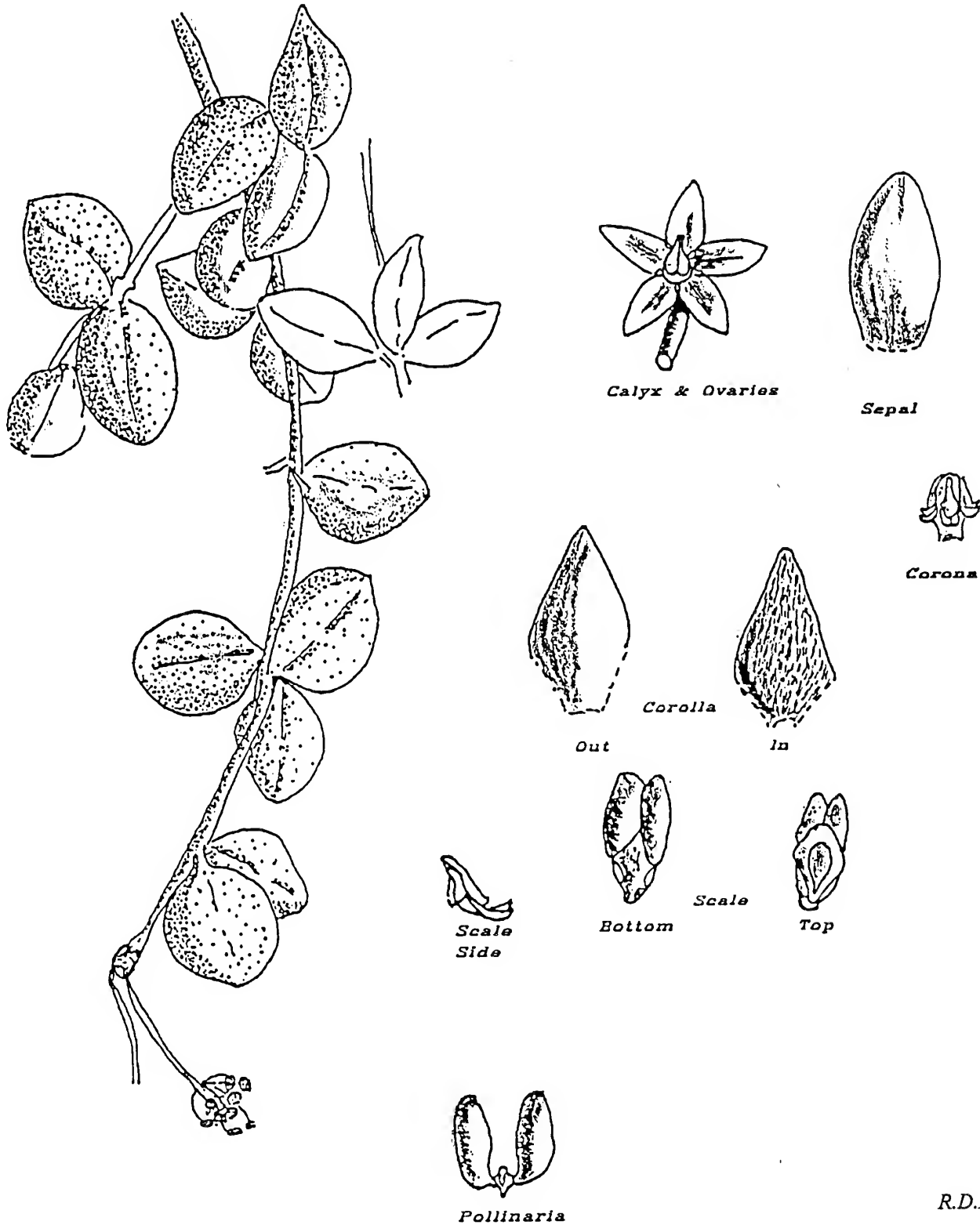
Note: Elmer quoted #8896 as the type number in Lfts. Philip. Bot. 1938 p. 3574. There is a discrepancy here. I have copies of both sheets and they do not appear to be the same species.

Enum. Philip. Fl. Pl. Vol. 3, (1923) p. 351. Philip. jour. of Sci. Vol. 3, p. 429, Dec. 1908. Leaflets of Philip. Bot. p. 3574, May 1938. The Hoyan Vol. 9 No. 4 pp. 62-65, 1988.

Sandkuhl #21290; Fenix #4124; Elmer #8896 1904 (US); Mearns #2854 1906 BS); Loher #14997 (UC).



Hoya bilobata Schlechter

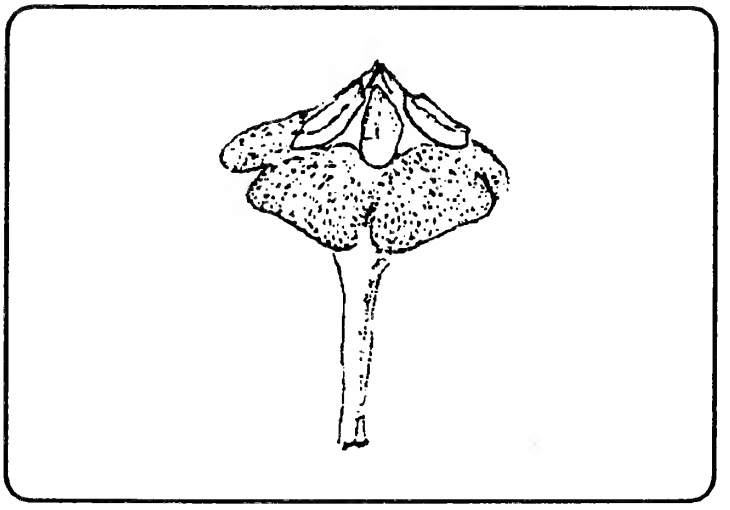


Hoya bilobata Schlechter in Philippine Journal of Science 1 pp. 301-302 (1906). Type: Copeland #420 (B) collected at Davao, Mindanao March 1904. Holotype at U.S. Nat. Herb. (Smithsonian) Section: Acanthostemma

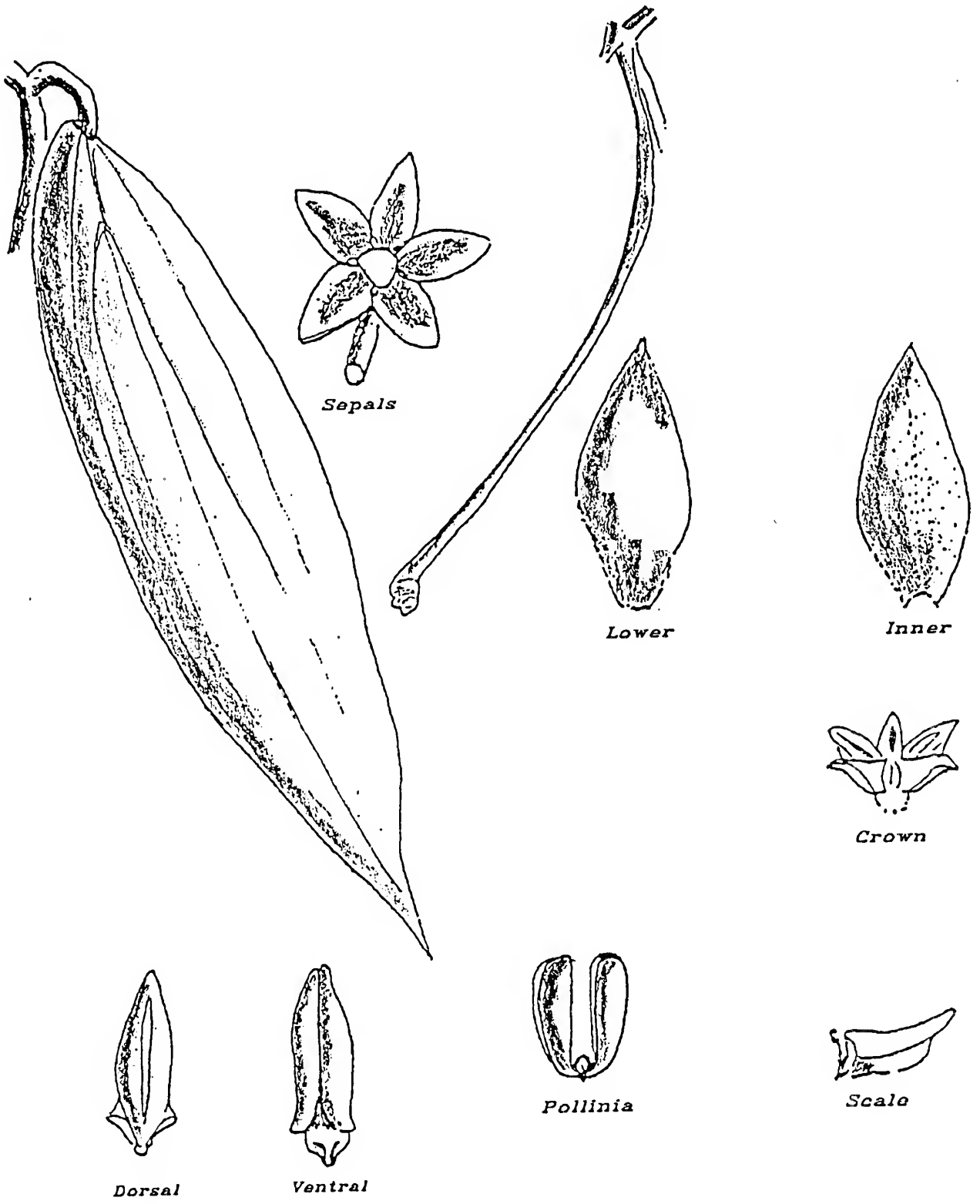
Epiphytic, much branched, long, terete, puberulous, and well leaved. Stems 0.1-0.2 cm. diam.. Leaves small, petiolate, broadly elliptic or orbicular, obtuse and glabrous, coriaceous; 1.7-2.2 cm. long, in the middle 1.3-1.8 cm. wide. Petiole about 0.3 cm. long, fleshy, inflorescense umbellate and flat, 20 flowered. Peduncle terete, glabrous 1-3 cm. long. Pedicels filiform, glabrous, up to 0.8 cm. long. Flowers among the smallest in the genera, about 0.3 cm. in diam.. Calyx segments oblong, obtuse, glabrous, scarcely 0.1cm. long; 1 ligule at intersection of each sepal. Corolla cut almost to the middle, outside glabrous, inside briefly and densely papillose, lobes recurved ovate, obtuse about 0.15 cm. long. Corona scales with inner lobe ascending, obtuse, beaked, outer lobe obtuse; a hump above the middle; lobes extending from below and beyond outer apex (they are the recurved sides of outer corona scale extended beyond the apex). Anthers scarcely evident. Pollinia keeled, not extending all the way to the translator, broad in width, outer apex angled in at 45 degrees, translators winged, clear, triangular, retinacula broad, outer apex winged. Luzon, Laguna; Mindanao, Zamboanga, Davao. On trees at low altitudes. Key # 22

Enum. Philip. Fl. Pl. Vol. 3, 1923, p. 3574. The Hoyan Vol. 3 #2 pp. 41-42 1981; Vol. 3 #3 p. 78.

Fenix #28437 1917; Ramos #10046, #15106, #16650; Hutchinson #4824. Wenzel #3003 1927 (UC); Castro #6540 1948 (PNH); Edano #11366 1948 (PNH); Taylor without# 1923 (UC).



Hoya bordenii Schlechter Type #1213 Borden June 1904 Lamao River, Mt. Mariveles Bataan, Philippines.
By Dale Kloppenburg 1990

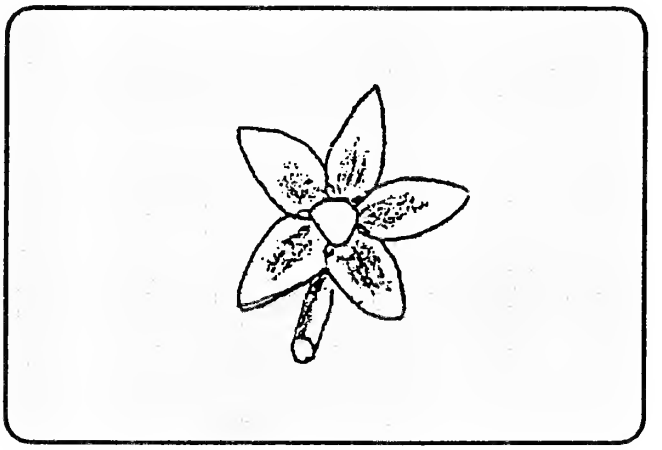


Hoya bordenii Schlechter, in Philippine Journal of Science 1st. supplement, p. 302, 1906. Type: Borden #1213 June 1904 (B), Mt. Mariveles, Bataan Prov., Luzon.

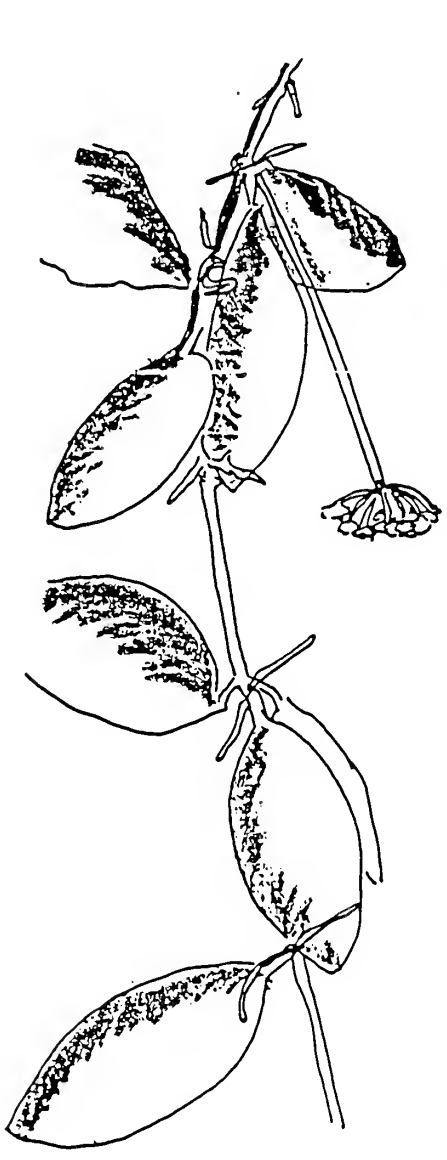
Epiphytic, branched stems filiform, elongated, flexuose, glabrous and loosely leafed. Leaves outspread, lanceolate-oblong or narrowly elliptic acuminate, glabrous, coriaceous, 11-18 cm. long, 2.5-4.5 cm. wide in the middle. Petiole fleshy, short, 1.5-2 cm. long, curved or straight, 0.4 cm. diam.; inflorescense umbellate, pedunculate. Peduncle 3-5 cm. long, terete, glabrous. Pedicels filiform, thin, glabrous, 2.7 cm. long. Flowers pink; like H. acuta Haw., similar size. Calyx segments ovate, somewhat obtuse, sparsely pubescent near base, 0.15 cm. long, one ligule present for each sepal. Corolla 1 cm. in diam., cut up to the middle, outside glabrous, inside shortly and sparsely granulose-papillose, lobes ovate acute. Corona scales horizontal, inner lobe narrowly elliptic, both ends somewhat acute, with a linear longitudinal ridge, channeled below. Anther apexes exceed inner lobe, margins flexible but firm and tough, narrowly falcate. Pollinia oblong, oblique. Translators very small. Retinacula smaller and rhomboid. On trees at low to medium altitudes. Luzon Province of Bataan, Mt. Mariveles in forest at 650 m. (Benguet, Bulacan, Pangasinan, Bataan, Cavite, Tayabas, Sorsogon). Key # 10

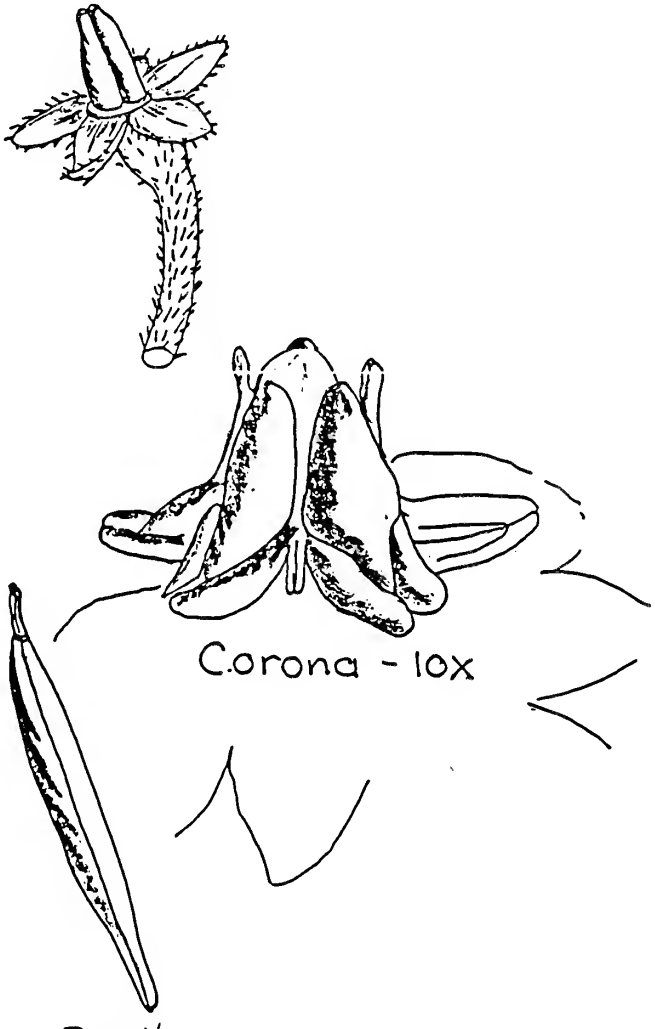
Lfts. of Philip. Bot. May 1, 1938, p. 3575. Enum. Philip. Fl. Pl. Vol. 3 (1923) p. 351. The Hoyan Vol. 11 #1 pp. 19-20.

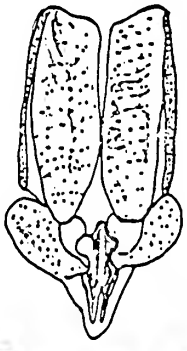
Ramos & Edano #34132 1926 (UC), Ramos & Deroy #22557 1906, Fenix #29900 1906 (BS), Merrill #7670 1911 (BO), Elmer #15829 1918 (BO, UC, A), #16151 1904 (A), Edano #76351 1928 (BS).

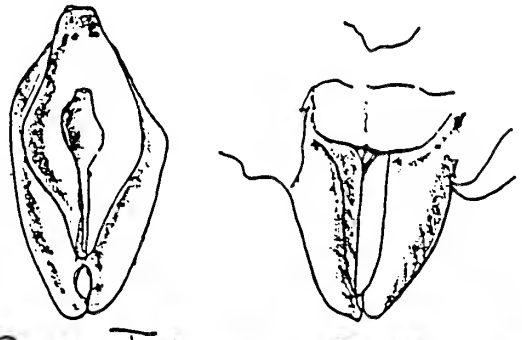


Hoya burtoniae Kloppenburg







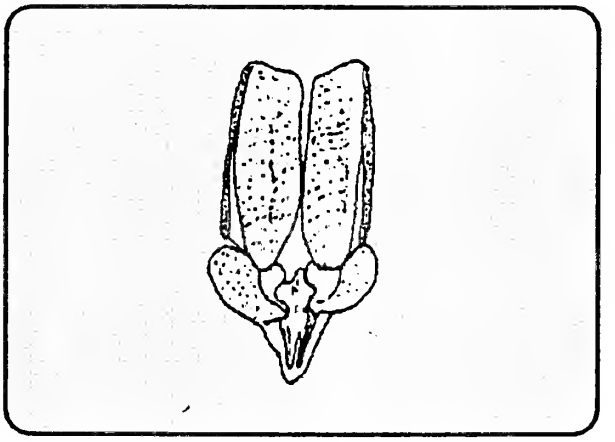


R.D.K.

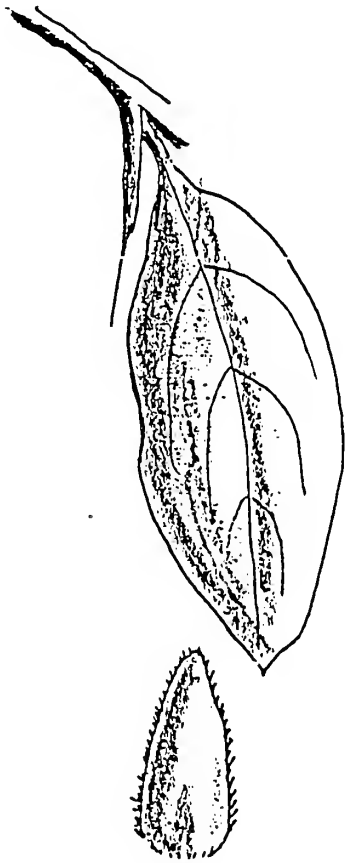
Hoya burtoniae Kloppenburg in the Hoyan Vol. 12 #1 Summer 1990. Type: Without #. Loher found in Montalban, Rizal province, Luzon, Philippines September 1909 (UC). Acanthostemma Section.

This is the collection location from which the type of hoya darwinii Loher was collected by Loher and in the same year. A small compact epiphytic vine, covered with a very fine velutinous pubescence, under which are fine punctations. Internodes 3.0-3.5 cm. long, green with enlarged nodes and often with a pair of adventitious short roots, tan and corky at these areas, sparingly branched. Petiole short, rigid 0.5 cm. long x 0.2-0.3 cm. in diameter, terete, puberlose, curved. Foliage deep green above, often with a lighter longitudinal area in the center (midrib area), thick and fleshy, enervis, no midrib visible, margins turned under, perfectly ovate, most often 3.0 cm. long x 0.2 cm. at the widest, plants in shade with longer leaves, undersides concave, usually purplish-rose in color, with all these surfaces covered with the fine velutinous pubescence. Peduncles about 0.3 cm. long, rigid, with rachis enlarged. Inflorescence axillary or terminal, positive geotropic. Pedicels terete 1.2-2.2 cm. long, curved (differing in length). Calyx segments individual, ovate, obtuse velutinous, about 0.12 cm. long with no ligules. Corolla about 1.1 cm. in diameter flat, reflexed, outside glabrous, inside puberlous, apical end with a triangular glabrous portion, ovate acute, lobes about 0.5 cm. wide 0.52 cm. in diameter, scales above narrowly elliptical, curved, outer apex covered over with two side lobe extensions (bilobed), inner lobe terminating in a thin rigid extension curling away from the stigma, below channeled part way. Pollinia vacuoled and keeled, attached to broadly winged caudicles and translators, retinaculum relatively small, bifid at the outer apex, covered over with a translucent membrane. Follicles narrowly linear, tapering to both ends, 10-15 cm. long. Key # 18

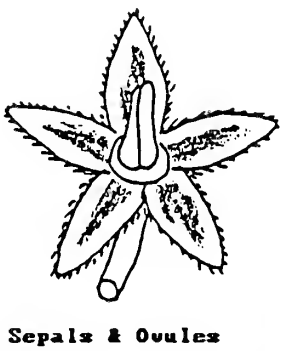
This plant is not represented by many herbarium collections and does not often show up in field collected material. The plant now in commerce was obtained from Dexter Heuschkel, Manila Memorial Gardens by myself and Ted Green in 1981. The subsequent renovation of the Aviary area destroyed this plant. Untill now this plant has been in commerce under the designation of Hoya sp. 81084.



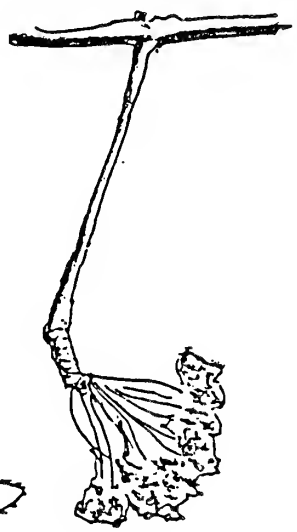
Hoya cagayanensis Schlechter Unpublished #7374 Maximo Ramos, Cagayan Province Luzon, Philippines. March 1909
By Dale Kloppenburg



Sepal

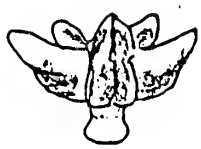


Sepals & Ovules



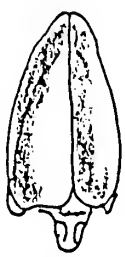
Outer

Inner



Crown

Dorsal



Ventral

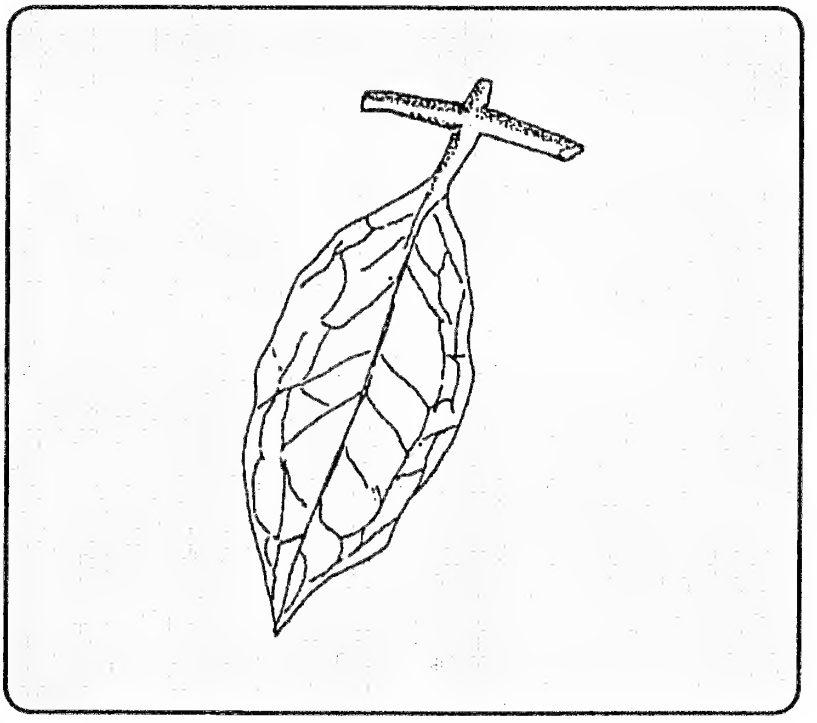
Pollinia

Scale

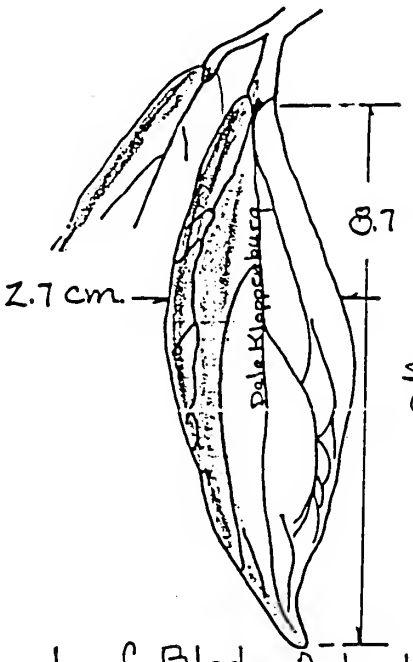
Hoya cagayanensis Burton in The Hoyan Vol. 8 #4 part 2 pp.b-c. 1987. Type: H. cagayanensis Schltr. (unpublished) #7374 (B) from Cagayan Prov., Luzon; Collected by Maximo Ramos March 1909.

A branching vine, slender, terete, glabrous. Leaves elliptic, thinly coriaceous, glabrous, penninerved and much reticulated, 7 or so on each side of fine midrib, 6.5-8.5 cm. long, and 2.5-3 cm. about the middle, narrowly ovate-lanceolate with acute apex. Petiole curved, 1cm. long, glabrous. Peduncle long and straight, 4 cm. x 0.15 cm., glabrous, enlarged toward the rachis which on the type sheet is 1.2 cm. x 0.4 cm. and scaly rough. Pedicels filiform, uniform length, 1.7 to3 cm. long (variation among umbels but not within), glabrous. Calyx lobes glabrous with ciliate edges, united at the base, broadly linear, rounded apex. Corolla about 1.4 cm. in diameter, outside glabrous, inside puberlous, obovate with mucronate apex, 0.6 cm. long and 0.33 cm. wide above the middle, lobed to below the middle, reflexed. Corona 0.6 cm. in diameter. Outer lobe raised slightly above inner lobe, obtuse, top of scale concave with umbo in center toward inner lobe; inner lobe narrowly and shortly beaked, erect; lobes channeled below (sulcate). Anther appendages exceeding inner lobe. Key # 35

Ramos & Edano #45730 (BO, UC,B). Casiguran, Tayabas, Quezon Prov, Luzon May/June 1925. Ramos & Edano #29062 Umiray, Tayabas Prov., Luzon, May/June 1917. McGregor #23173 Luguna Prov., Luzon June/Aug. 1915. Ramos #45570 1925 (BO).



Hoya camphorifolia Warburg Without # Sampaloc, Tayabas Province, Luzon, Philippines
By Dale Kloppenburg 1990



Leaf Blade:
longest 11 cm.
some 7 cm. Most
9 cm. long. 2.6-
2.9 cm. wide

Leaf Blade Actual tracing

Petiole: 1 cm. long × 0.1

Peduncle: 9.5 × 0.1 cm.

rachis 0.6 × 0.3 cm.

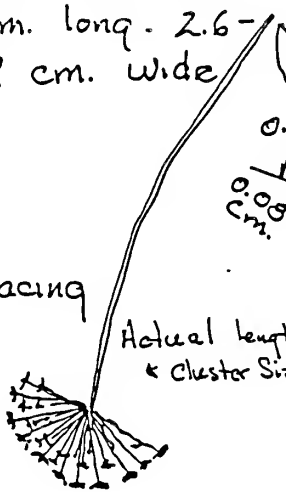
Pedicel: 1.1 cm.

Corolla: 0.9 cm. flat

Corona: 0.26 cm. diam.

Ovules: short blun
0.1 cm. tall

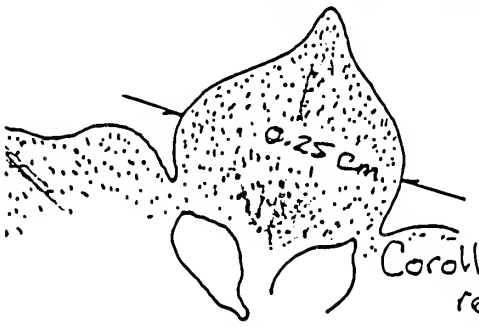
Calyx: 0. diam.
out: punctate
one
gland(ar
at each bas



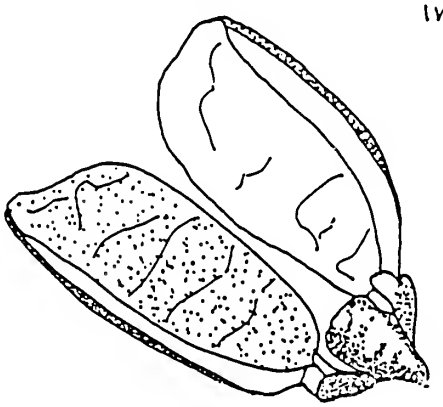
Actual length
& Cluster Size

2.2 cm. glabrous

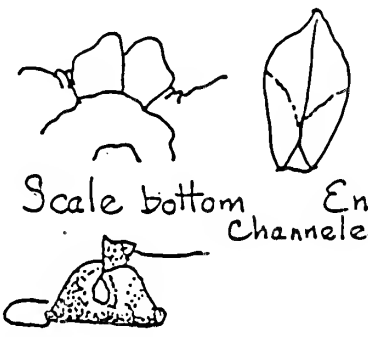
0.09 cm.



Corolla: out glabrous
regularly & sparsely punctate
inside papillose

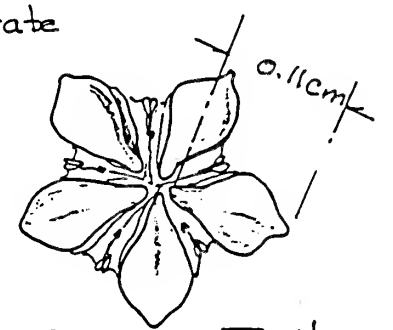


Pollinia



Scale bottom End
Channeled

Retinacula Side View



Corona Top View

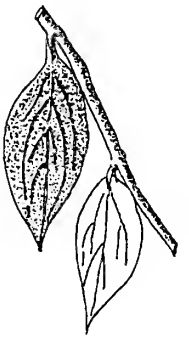
Side

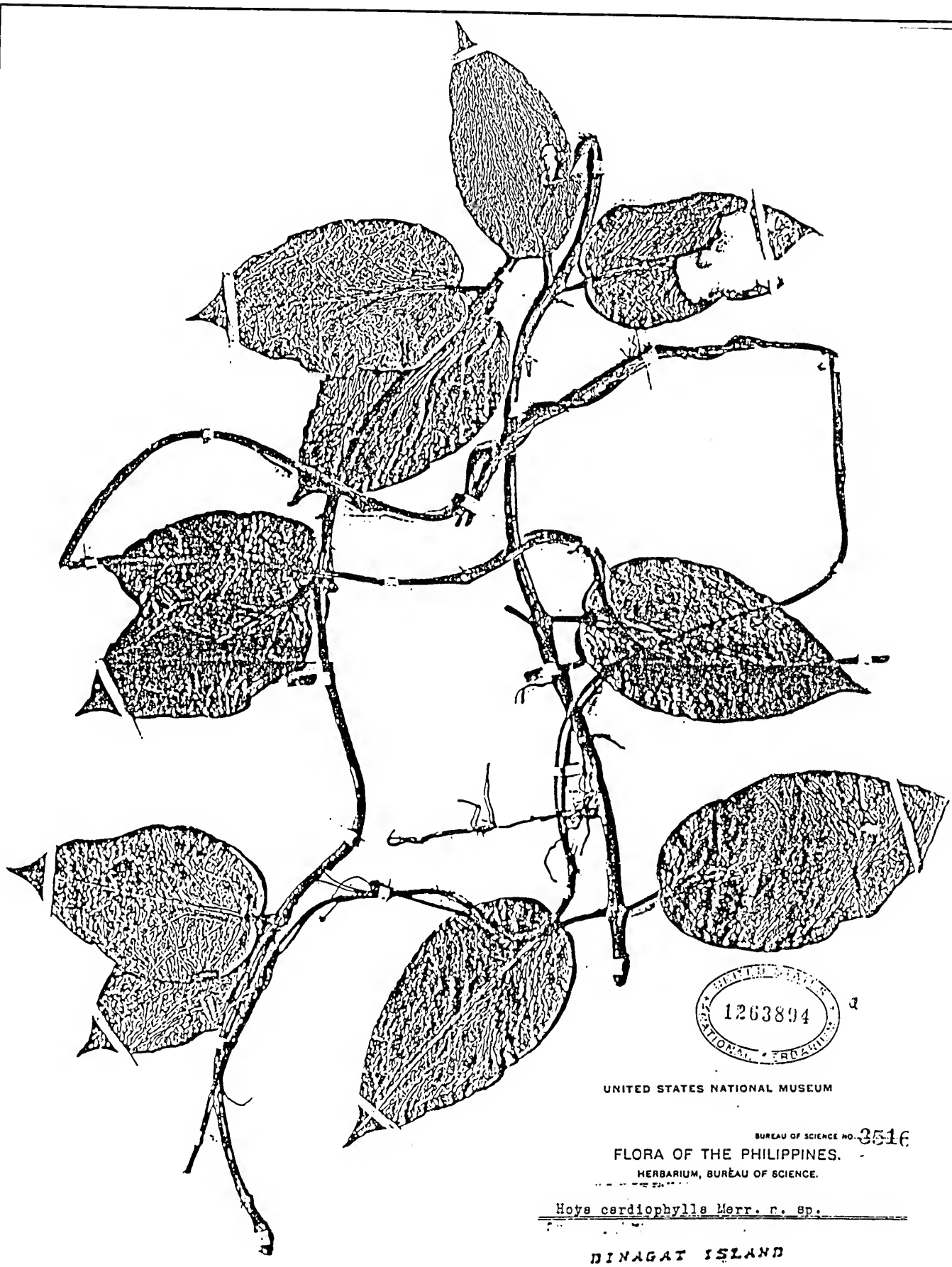
Hoya camphorifolia Warburg in Perkins Frag. Fl. Philipp., Vol. 1, (1904) p. 129, Type: Warburg without number.

A slender branched vining plant, having lenticles reduced to a point and elevated, distributed upon the branches, glabrous. Petiole curved or twisted, round, lenticled or wrinkled, similar in color to the stems, but exhibiting some purpling on new growth, 1 cm. long, 0.1cm. in diameter. Leaf blade glabrous on both sides, parchment like,ovate elliptic or elliptic, 6 to 9 cm. long, in the middle 2.5 to 3.5 cm. wide, apex acuminate acute often curled back, often convex on underside, bases narrowly rounded. Veins 2-3 on both surfaces ascending, not all reaching the apex, reticulate, distinct but not prominent. Peduncles long and filamentose, straight, glabrous, 8-9 cm. long 0.1 cm. diam., rachis enlarged 0.3-0.4 cm. in diam. rough. Pedicels of equal length 1.1 cm. long, filamentose, forming a geotropic convex umbel, glabrous, usually 19-23 in number, very pale green. Sepals 0.1 -0.2 cm. long, lanceolate, tip narrowly rounded to acute, outside glabrous granulate, inside concave glabrous smooth, less than 0.1 cm. wide at base, 1 ligule at each juncture, not overlapping. Corolla 0.6 cm. diam., flattened to 0.9 cm., outside glabrous regularly and sparsely punctate, inside papillose, lobes broadly triangular 0.25 cm. at widest, sinus 3/4 to base. Corona waxy, scales elliptic, boat shaped, concave above, longitudinally lined, bottom lined and channeled, outer apex higher than inner and obtuse, inner apex erect acute, anther appendages exceeding, scales do not reach sinus of corolla. Pollinia very broad and short, vacuole present, keel does not extend to translator which is narrowly winged, retinacula also short, broad at top, channeled end covered by wings. Stigma broadly , triangular, tip loosely globular. Flower rose with darker center, remains open for short time. A.D.E. Elmer " dangling masses from limbs and branches of trees in forest of a depression at 1000' altitude....arising from an ant nest". Luzon, (Benguet, Tyabas,Sorsogon); Mindanao. Key # 37

Leaflets of Philippine Botany 1 May 1938, Vol. X Art. 131, p. 3577. Enumeration of Philippine Flowering Plants Vol. 3 p. 351. The Hoyan Vol. 9 #2 1987 pp. 23-25. Vol. 5 #2 1984 pp. 30-40.

Elmer #15244 1915 (CAS,BO,UC,A, # 15803 1916 (BO,A) Irosin. McGregor #334 1909. Robinson #14082, #14032. Ramos & Edano #29092 1924 (UC); #75136 1926 (PNH); #75540 1928 (UC); #75425 1928 (UC). Edano #40215 1959 (PNH). Fox #8975 1948 (PNH). Salvosa #29660 1924. Wenzel #2p 1928 (UC). Saprid & Alvarez # 28822 1977(CAHUP).





BUREAU OF SCIENCE NO. 3516

FLORA OF THE PHILIPPINES.

HERBARIUM, BUREAU OF SCIENCE.

Hoya cardiophylla Merr. n. sp.

DINAGAT ISLAND

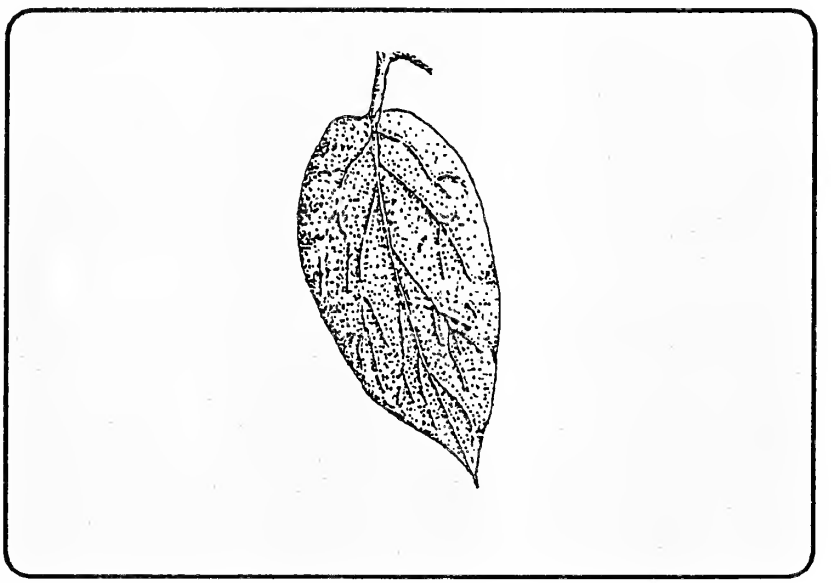
M. RAMOS
J. PASCASIO — MAY 1919

Coll. —107

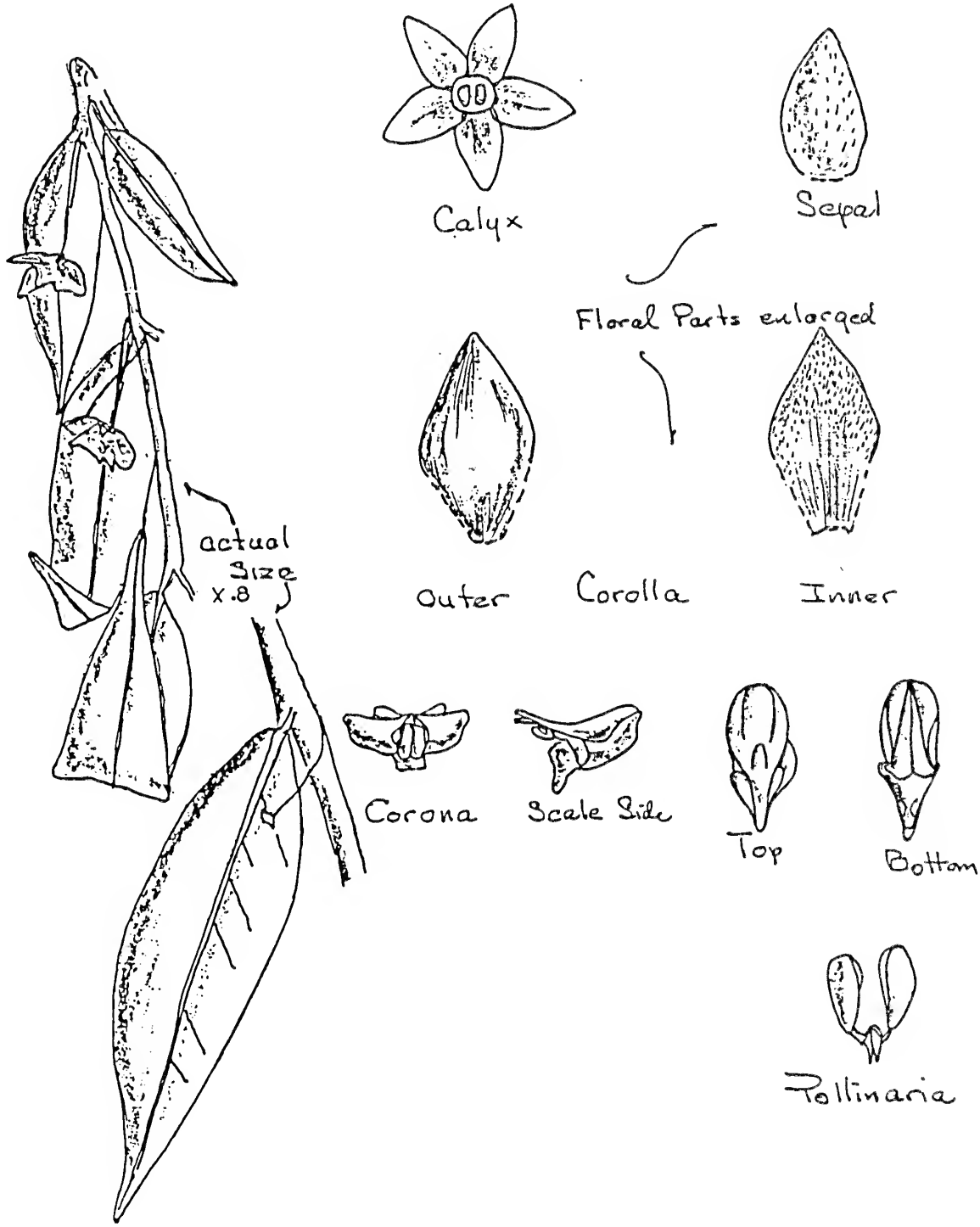
Hoya cardiophylla Merrill in Philippine Journal of Science Vol. 17 p. 310 (1920-1921) Type Sheet: Ramos & Pascasio #35160 13 May 1919 on trunks of trees at low altitudes, Dinagat.

Epiphytic vine, new growth sparsely pilose, becoming glabrous with age. Leaves heart shaped and fleshy 5-7 cm. long, 4.5-5 cm. wide, glabrous with some cilia on margins when young, base broad, rounded and distinctly cordate, sinus acute, apex shortly and sharply acuminate. Petioles 0.5-0.7 cm. long; lateral nerves about 4 on each side of midrib, somewhat spreading, anastomosing, reticulations lax and distinct on both surfaces. Umbels many flowered, yellow/ white 1.0-1.1 cm. in diameter. Pedicels glabrous 2 cm. long. Calyx lobes triangular ovate, acute or obtuse 0.1 cm. long. Corolla lobes rhomboid obovate, acuminate, about 0.4 cm. long, obtuse or somewhat acute, tips more or less inflexed. Corona outer lobes oblong ovate acuminate, turgid, somewhat crustaceous; upper surface somewhat concave. Staminal column short, sessile. Key #32

Enumeration of Philippine Flowering Plants Vol. 3 (1923) p.315.

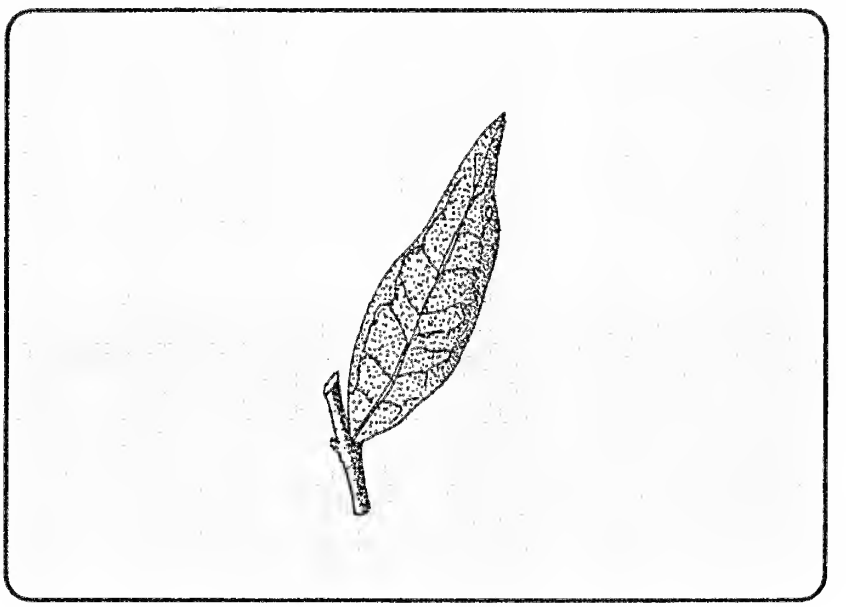


Tracings from Schlechter's H. leucantha sheet. Collected by Elmer D. Merrill Nov. 1906 on the Alag River, Mindoro, Philippines # 5650. By Dale Kloppenburg 1990
H. cembra Kloppenburg

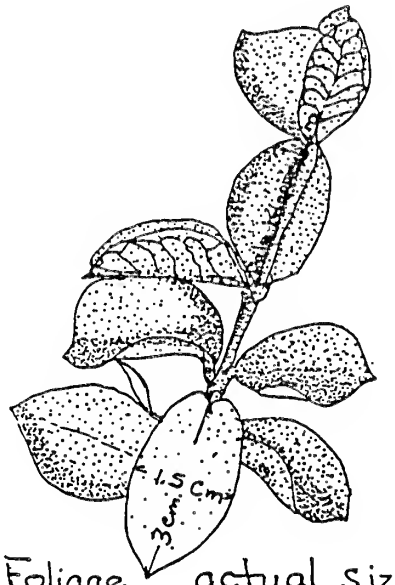


Hoya cembra Kloppenburg in Fraterna 3rd. quarter 1990. Type #5650 (B) of Elmer D. Merrill collected in thickets along the Alag River, Mindoro at 300 m. altitude, Nov. 1906.

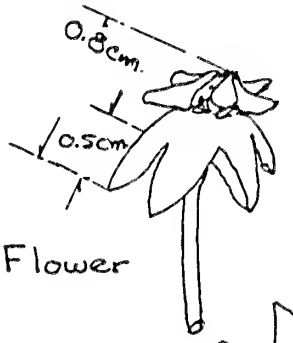
An epiphytic scandent and terrestrial plant, more bush than vine, sparingly branched and then more often from the basal region, glabrous, branches flexible but rigid, stems fairly large to 0.5 cm. in diameter, smaller terminally. Foliage erect outspreading, fairly thick with internodes about 4 cm. long. Leaves larger than in H. odorata, a related species, more narrowly elliptic, glabrous, 8-10 cm. long x 2-3 cm. wide along the middle section. Tapering at both ends, apex rostrate, narrow and pointed, with short petioles about 0.5 cm. long, grooved, glabrous. Pedicels filiform, terete, glabrous, arising from nodal areas, few or solitary 2.5 cm. long. Calyx segments lanceolate-oblong obtuse, ciliate outside, glabrous within, with ligules present. Corolla white, rotate, about 1.8 cm. in diameter, triangular acute lobes, outside glabrous, inside all pubescent, apex obtuse. Corona horizontal, inner lobe of scale stretched out narrowly and long acuminate, sculptured below with an umbo on the upper surface, outer apex blunt and rounded, sulcate about 2/3 on outer end of outer lobe and below. Anther appendages slightly exceed the scale inner lobe. Pollinaria with wide rather squat pollinia, winged with fairly long translators, retinaculum rather broad, bifid at the outer apex.
Key #5



Hoya cumingiana Decaisne From clone collected by Prof. Juan V. Pancho in N. Luzon, Philippines By Dale Kloppenburg 1990

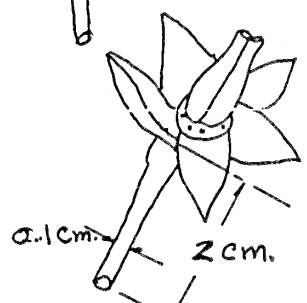


Foliage actual size

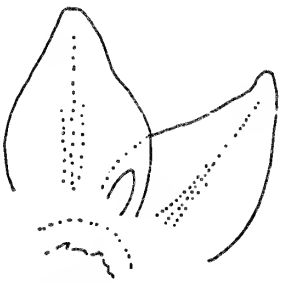


Flower

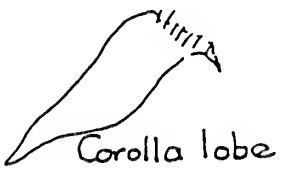
Petiole: 0.5± cm.
Peduncle: 2.8 cm.
Pedicel: 2 × 0.1 cm
Flower: 1.6 cm. diam.
Crown: 0.7 cm diam.



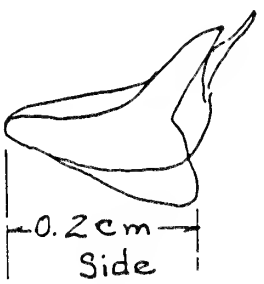
Calyx + Ovules

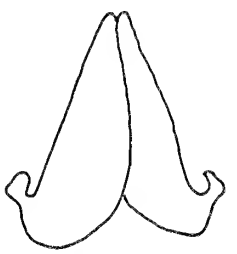


Sepals



Corolla lobe

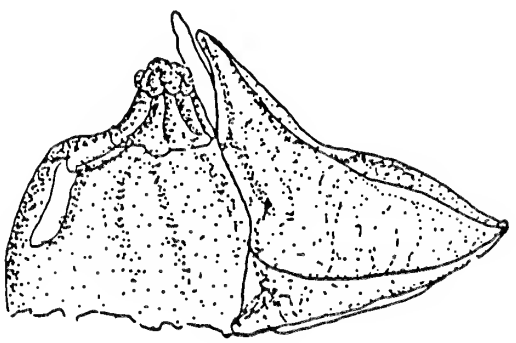




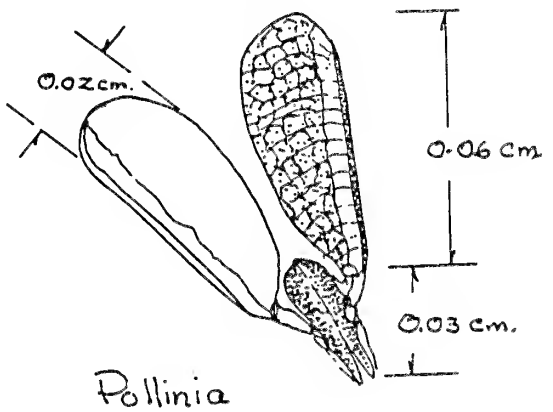
Bottom

Top

Scale



Stigma + Scale



Pollinia

Hoya cumingiana Decaisne, in D.C. Prodromus, Vol. 8, p. 636 (1844) Ins. Philipp. Type: Cuming # 1480. Section: Plocostemma.

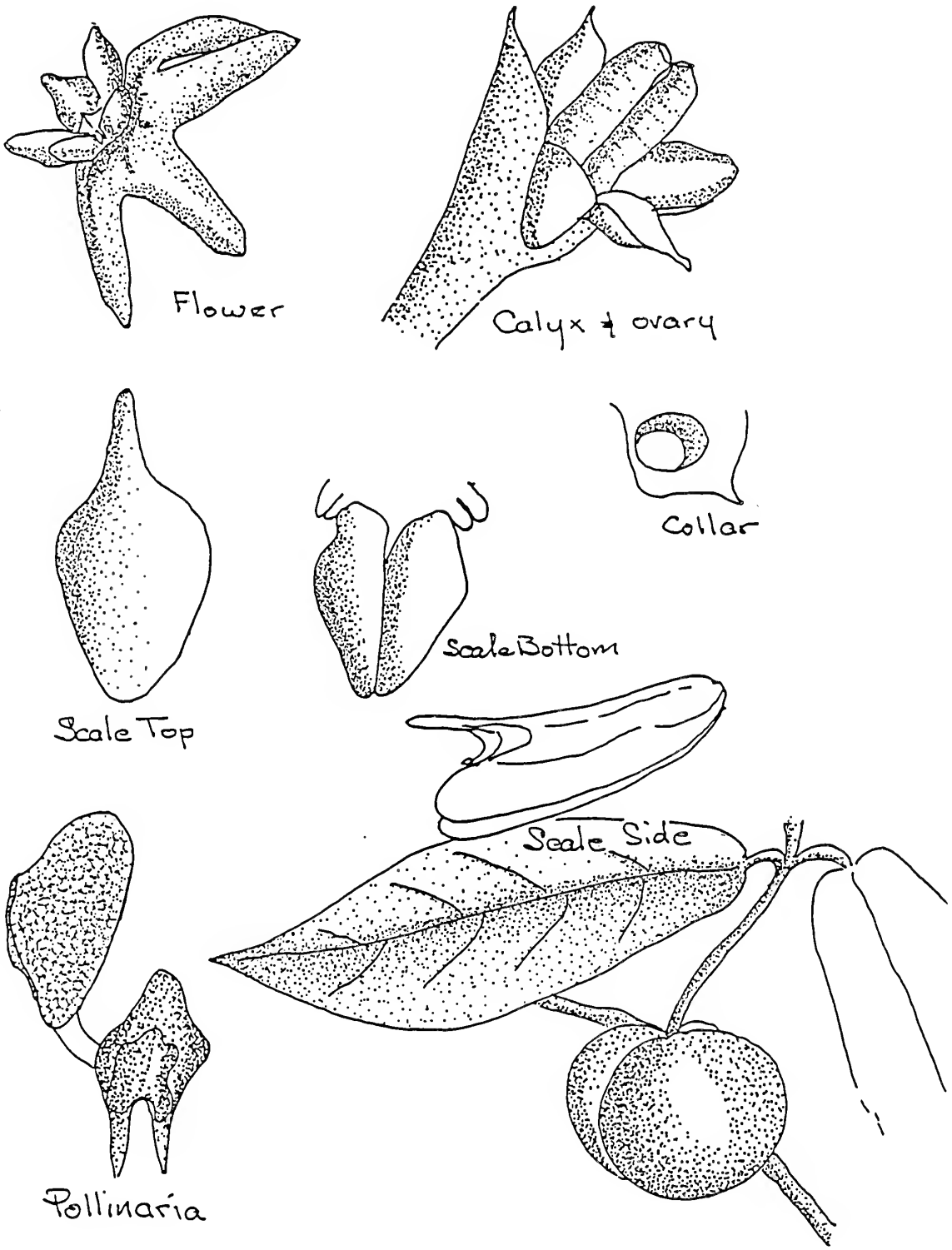
A very adaptive species preferring limestone locations, outcroppings, cliffs, boulders, and roadcuts in open places from sea level to 2000 m.. It is a scandent shrub with both pendulous and upward twining stems, glabrous leafy branches, green becoming woody, leaves ovate cordate. Variable in leaf size, shape and pubescence. Peduncle and pedicel length are also variable, but it is easily recognizable and distinctive. Leaves in general glabrous above, venous, papillose-velvety below, shortly petiolate. Petiole 0.5 + cm. long. Peduncles 2.8 + cm. long thickening toward the rachis. Pedicels variable in length 1.5-2.5 cm. long, all green, mostly glabrous except in the forms approaching the densifolia types. Few flowers per umbel. Calyx lobes overlapping at base, apex narrowly rounded almost mucronate, glabrous except for very sparse hairs on outer surface, curved downward (reflex), ligule at base of each lobe. Corolla lobes triangular acute and reflexed, outside glabrous, inside papillose. Corona raised in the center, anther appendages exceeding inner lobe which is extended forward. Scales slightly concave above, outer lobe narrowly ovate. Lobes with side protrusions and channeled below. Stigma is capitate and well developed. Pollinia 0.06 cm. long x 0.02 cm. wide, keeled and with adjacent vacuole, outer lobe rounded. Translators short and narrow. Retinacula long, narrow 0.03 cm. x 0.01 cm. with divided outer lobe.
Key # 1

Decaisne, DC Prodramus. Vol. 8 p.636 (1844). Flore Des Serres, Vol. 7, p. 176 (1851-1852). Flore Des Seres, Vol. 23, pp. 121-122 (1852-1853). DeVries Tuinbouw Flora, Vol. 1, p. 71 (1855). Zollinger & Miquel, Fl. Ind. Bat., Vol. 2 p. 518 (1856). Icones Addendae Annales Bot. Sys. Vol. 5 p. 506. Curtis's Bot. Mag. tab. 5148, (1859). Revue Horticole de Paris, p. 502 (1860). Drawing & detail FDS, Vol. 23, p. 120 (1880). F. Vill. Novis App. p. 135 (1880). The garden p. 55 Jan. 20 (1883). Vidal Phan. Cuming Philip. p. 127 (1885). Geo. Nicholson Dict. of Gdng. (1885). Rev. Pl. Vasc. Filip. p. 189 (1886). Jour. of Bot. Vol. 36 p. 416 (1896). Philip. Jour. Sci. Vol. 1. Supp. 119, 5 (1911). Philip. Jour. Sci. Vol. 5, p. 379, nov. (1910). Enum. Philip. Fl. Pl. Vol. 3, pp. 351-352 (1923). Sunyatsenia Vol. 3 #2/3, p. 176 (1936). Leaflets of Philip. Bot. Vol. 10, Art. 131 p. 3581 (1938). Dict RHS..Paxton's Fl. Gdn. Vol. 2, p. 114 n 382. Paxton's Mag. of Bot. xiii, p. 263. Watercolor by Daniel Girard Elliot, ornotholigist at New York Bot. Gdn. Library. The Hoyan Vol. 8 #3 pp. 40-41 1987.

Luzon (Benguet, Bontoc, Bataan, Rizal, Camarines), Mindoro, Ticao, Palawan, Mayon Valcano, Albay Prov, Luzon et. al. Bartlett #14356 1935 (A); Celestino #4401 1948 (PNH,A); C.M.Z. #16074 ; Cuming #1480 ; Elmer #6419 1909; Hernandez #19059 1966 (CAHUP); Kienholz #134 1924 (UC); Loher #14291 1913 (UC); Clemens #5888 1925 (UC); Merrill #6352, #9435 (A), #11562 ; Mcgregor #8803 ; Ramos #26221 1916, #3256, #22214 ; Ramos & Edano #75716 ; Rimando #18681 ; Sijor #27431 1919 (UC); Sinclair #9757 1958 (PNH, SING).Lindl #382; Witford #311 1906.

Hoya darwinii Loher

By Dale Kloppenburg 1990

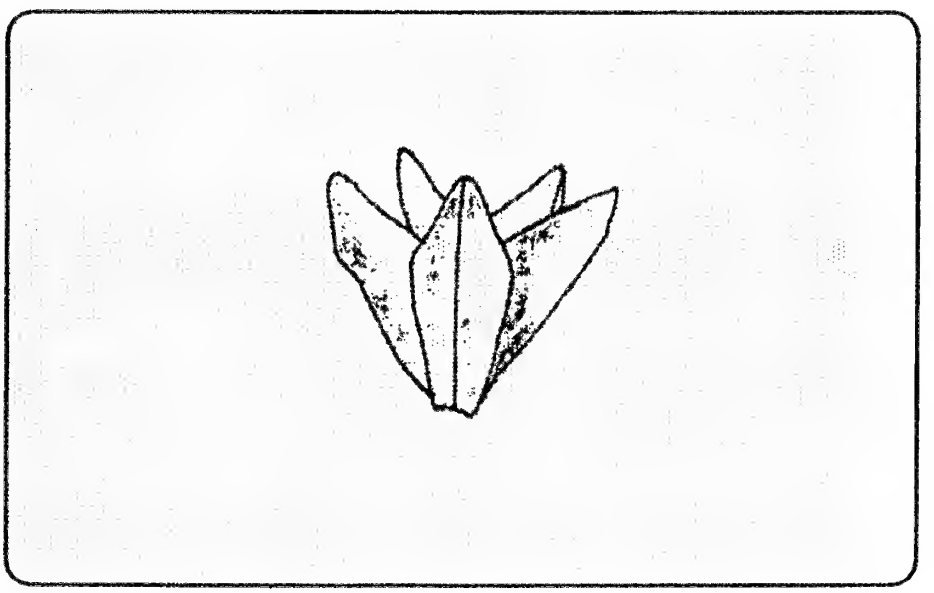


Hoya darwinii Loher in Gardener's Chronicle Vol. 47 (1910) p. 66 (3rd Series) Type: #14574, Loher (UC). Section: Eu-Hoya. Mountains of Luzon flowering in March-April 1909.

A much branched, glabrous vine with dimorphic leaves. Normal leaves elliptic oblong, 15-20 cm. long, 5-6 cm. wide, glabrous, leathery, with inconspicuous nerves, briefly petiolate; other leaves bullate, a globose pouch of 4-6 cavities, well closed. (ants habitat). Pedicel glabrous 4.0 cm. long 0.2 cm. in diameter. Calyx broadly ovate 0.24 cm. tall x 0.26 at broadest just below middle, edges ciliate, ragged and hyaline, ligules present on a ring inside calyx proper. Corolla deeply lobed, salmon pink, lobes cordate ovate, 2 cm. in diameter, 3.4 cm. flat, reflexed, glabrous, shiny, collar very short. Corona lobes erect, large triangular, conical, below sulcate nearly to the base, column and underside of scale to channel covered with silky matted hairs, inner angles touching in center and covering the stigma head. Anther wings swollen. Stigma blunt, incumbent. Pollinia compressed, broad, keeled only a short distance, almost sessile, broadly rounded at apex, narrowly rounded at base, retinaculum plainly visible, broad rounded head, broader at wings, sharp bifid apex, hyaline. Luzon (Rizal, Tayabas) Panay. Tagalog name "Kalitkit". Key # 29

Fedde Reportorium Vol. 11, #418 (1912) p. 96; Enumeration of Philippine Flowering Plants Vol. 3 p. 352; US Nat. Mus., Plants of the Philippine Islands (5 pictures) Photos from Munich Bot. Gdn. by T.H. Haas; The N.Y. Bot. Gdn. Ill. Encyclopedia of Hort. Vol. 5 (1981) p. 1726; The Hoyan Vol. 1 #3 (1979) p. 71.

Whitford #790, Ramos and Edano #35522 1910; Loher #14990 1909 (UC), #14574 1909 (UC), Damo without # 1926 (UC). Peele #815 1926.



FEB 14 1. 1930 BUREAU OF SCIENCE NO. 17136

FLORA OF THE PHILIPPINES

HERBARIUM, BUREAU OF SCIENCE

Hoya fischeriana Warb.

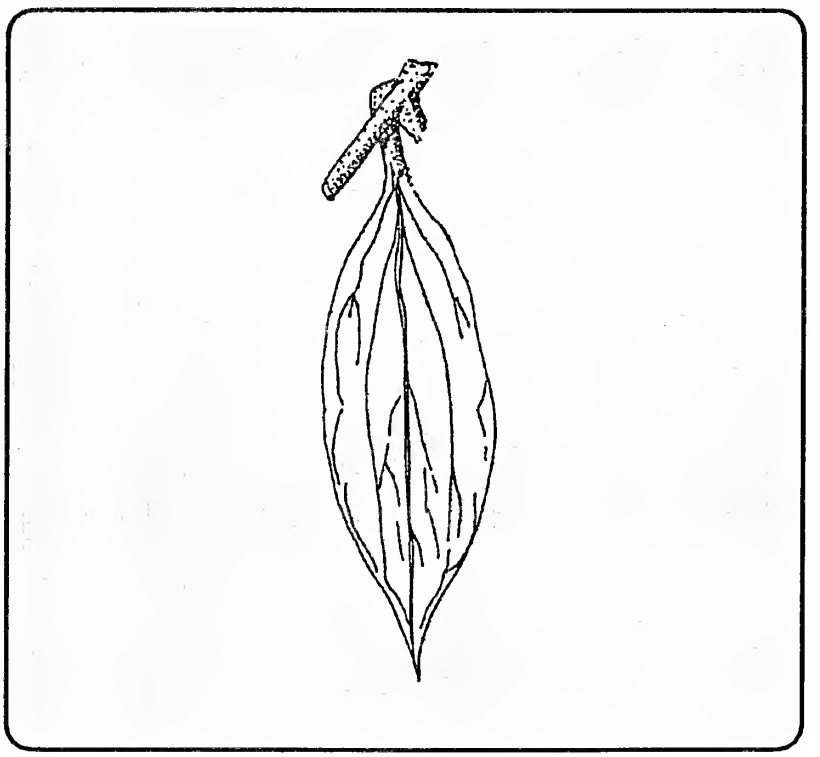
SAN MARIANO
ISABELA PROVINCE
LUZON

Hoya fischeriana Warb. in Perkens Fragmentia Florae Philippinae Vol. 1 (1904) p. 129. Type: Warburg #11955, Maluna, Isabella Prov., Luzon.

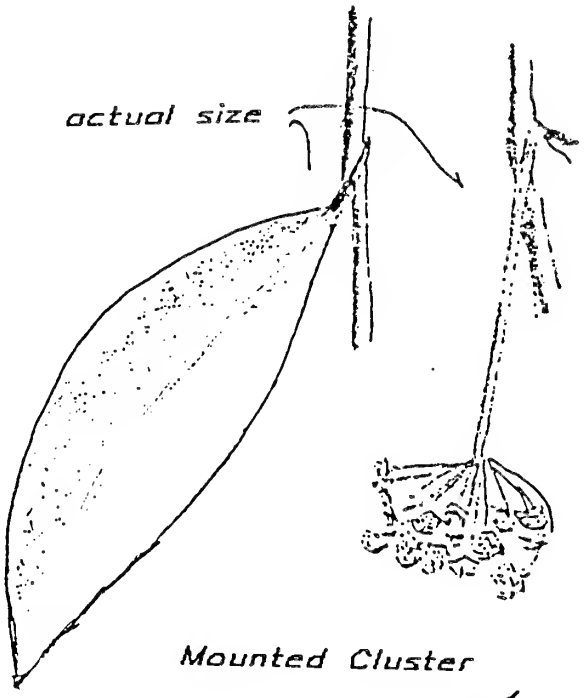
Leaves thick coriaceous, broadly lanceolate, 12-19 cm. long, 4-7 cm. wide, both base and apex acute, glabrous with 5 nerves inside almost reaching the apex, reticulated, all distinct. Petiole 2-3.5 cm. long 0.2-0.3 cm. diameter. Rachis cylindrical 0.3 cm. diameter. Pedicel glabrous, filiform about 1.5 cm. long. Sepals broadly lanceolate 0.1 cm. long, glabrous. Corolla 0.7 cm. in diameter, outside glabrous, inside somewhat papillose, deeply lobed, lobes rhomboid. Corona scales spreading, broadly lanceolate both ends acute, apexes of inner lobe elevated, outer lobe not recurved. Fruit peduncles 2 cm. long 0.04 cm. in diameter. Seeds tawny, linerally flattened out 0.4 cm. long, 0.075 cm. broad. Comma almost 3 cm. long. Luzon (Isabela, Ilocos Norte) Mindoro, Biliron, Dinagat, Mindanao (Surigao, Davao) Key #12

Enumeration of Philippine Flowering Plants Vol. 3 p. 352 Merrill; The Hoyan Vol .9 #2 (1987) pp. 23- 26.

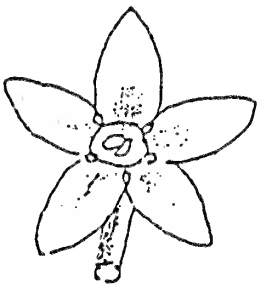
Copeland #421; McGregor #333, #18529 1914; Ramos #32905 (BS), #32906 (BS); Ramos & Pascasio #35256 1959 (PHU,UC),.Ramos & Edano #47136 1929 (BO,B,UC) #85130 (A), #75526 1928 (BO,UC), #49395 1927 (UC); Edano #40187 1959 (PNH), ? ; Clemens #16790 1926 (UC); #17136 1930.



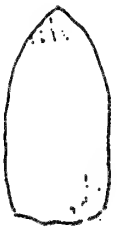
Hoya gracilis Schlechter Type # (not numbered) Schlechter 9 June 1886
Talisse Island, Celebes
By Dale Kloppenburg 1990



Mounted Cluster



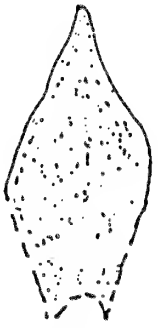
Calyx



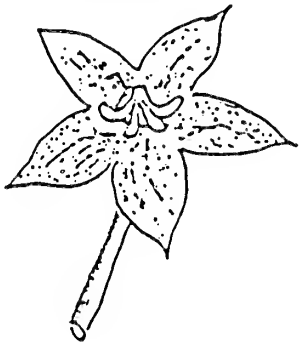
Sepal

Outer

Corolla



Inner



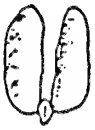
Flower

enlarged

Crown

Dorsal

Ventral



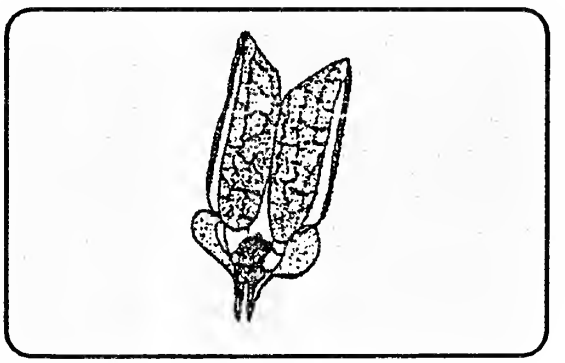
Pollinia

Hoya gracilis Schlechter in Engler Beiblatt Zu Den Botanischen Jarbruchen 40 #92 1908 p. 14. Type: Collected in the Celebes near Talisso by a native named Sammlers, blooming in June 1896. No Type number listed. Found in the Philippines and often listed as Variety philippinensis. Section: Acanthostemma.

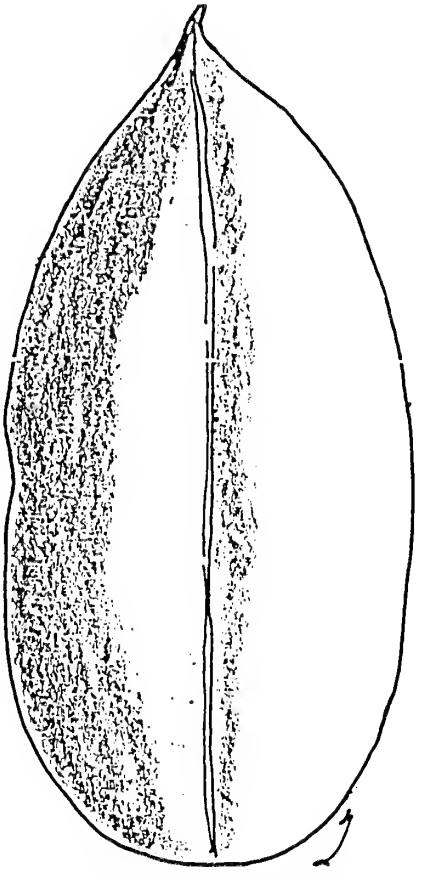
An ephiphyte growing in damp forests forming mats of its rigid, much branched stems. Stems filiform, branched and rebranched, loosely leaved, rooting at nodes. Leaves spreading, shortly petiolate, lanceolate-elliptic acute or somewhat obtuse with cuneate bases, glabrous, lucid, thick coriaceous texture, 5.5 - 7.5 cm. long, 1.8 - 2.3cm. wide in the middle. Petiole thicker, 0.5 - 1 cm. long,glabrous. Umbelliferous inflorescence with slender filiform peduncles, 20 - 30 flowers per cluster, peduncle terete glabrous, 4 -6 cm. long. Pedicels filiform 1.2 - 2 cm. long, curving deflexed, reddish. Calyx segments oblong obtuse, glabrous, about 0.15 cm. long, ligules present. Corolla subrotate, recurved about 0.7 cm. in diameter, 5 lobed up to the middle, outside glabrous, inside very minutely papillose-puberulent,lobes ovate shortly acuminate, reddish. Corona scales with tip and back ascending, both apexes elliptic-lanceolate, the interior smaller and shorter, beneath are two extended lobes (bilobed), obtuse, innerlobe extending beyond the anthers. Anthers trapezoid, edges hyaline,ovate. Pollinia oblique, oblong, translators very short, retinacula minute, rhomboid. Stigma conical capitate. Follicles slender filiform, glabrous with beak gradually extended forward about 11 cm. long, the middle nearly 0.3 cm in diameter. Aputulibung in Bagobo dialect. Luzon (Sorsogon), Mindanao, Panay. In primary forests on ridges extending into the mossy forests, high altitude. Key # 19

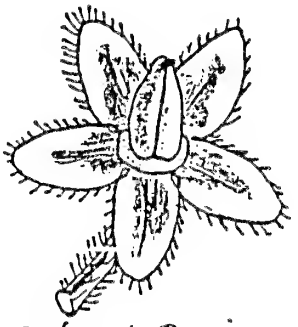
Leaflets of Philippine Botany 1 May 1938, Vol. 10, Art. 131 p.3581. Enumeration of Philippine Flowering Plants Vol. 3, 1923 p. 352. Engl. Bot. Jahrb. Vol. 40 1908, Beibl. 92: 14. Enumeration of Philippine Flowering Plants Vol. 4 p.97.

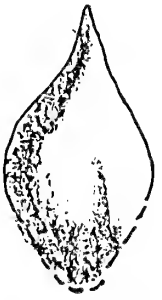
Elmer #10482 1904 (BO); Merrill #5653 1906 (B), #5679, #5673; McGregor #32378 1918 (BO), #52372 1918 (BO); Felix #15703; Merritt#6874; Ramos & Edano #45478 1925 (UC), 45477 1925 (UC), #45570 1925 (UC); Edano #7404 1946 (PNH), #333 1974 (PNH) Ramos & Convocar #83890 1931 (PNH); Britton #19519 1953 (PNH); Fox #5023 1948 (PNH); Sulit #9894 1949 (PNH); Allen #150190 1981 (PNH); Mendoza #41905 1961(PNH).



Tracings from Schlechter's H. halconensis sheet #5674 collected by Elmer D. Merrill November 1906 on Mt. Halcon, Mindoro, Philippines in mossy forest at 900 m. altitude By Dale Kloppenburg 1990

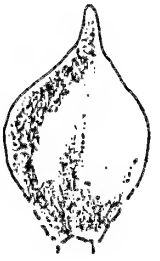


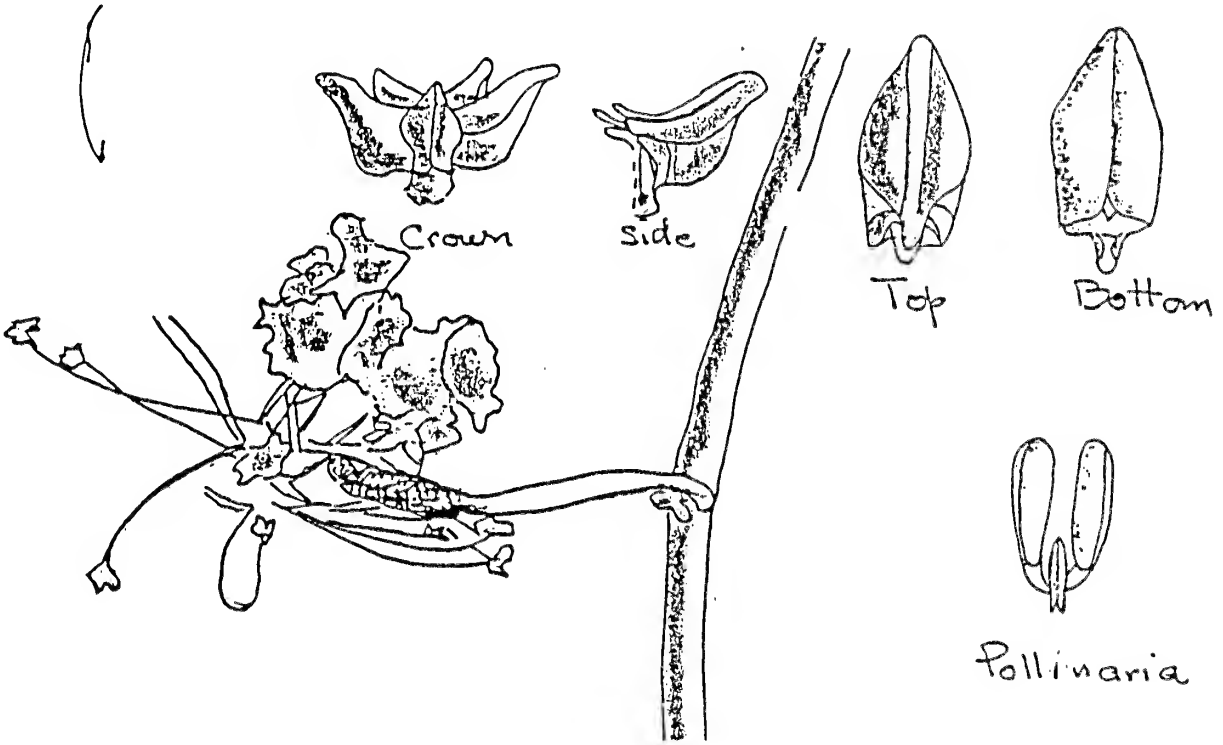




Flower Parts enlarged

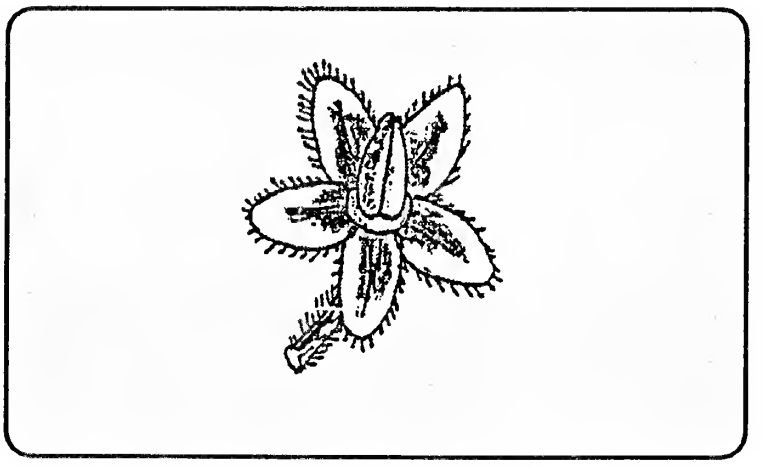
Corolla





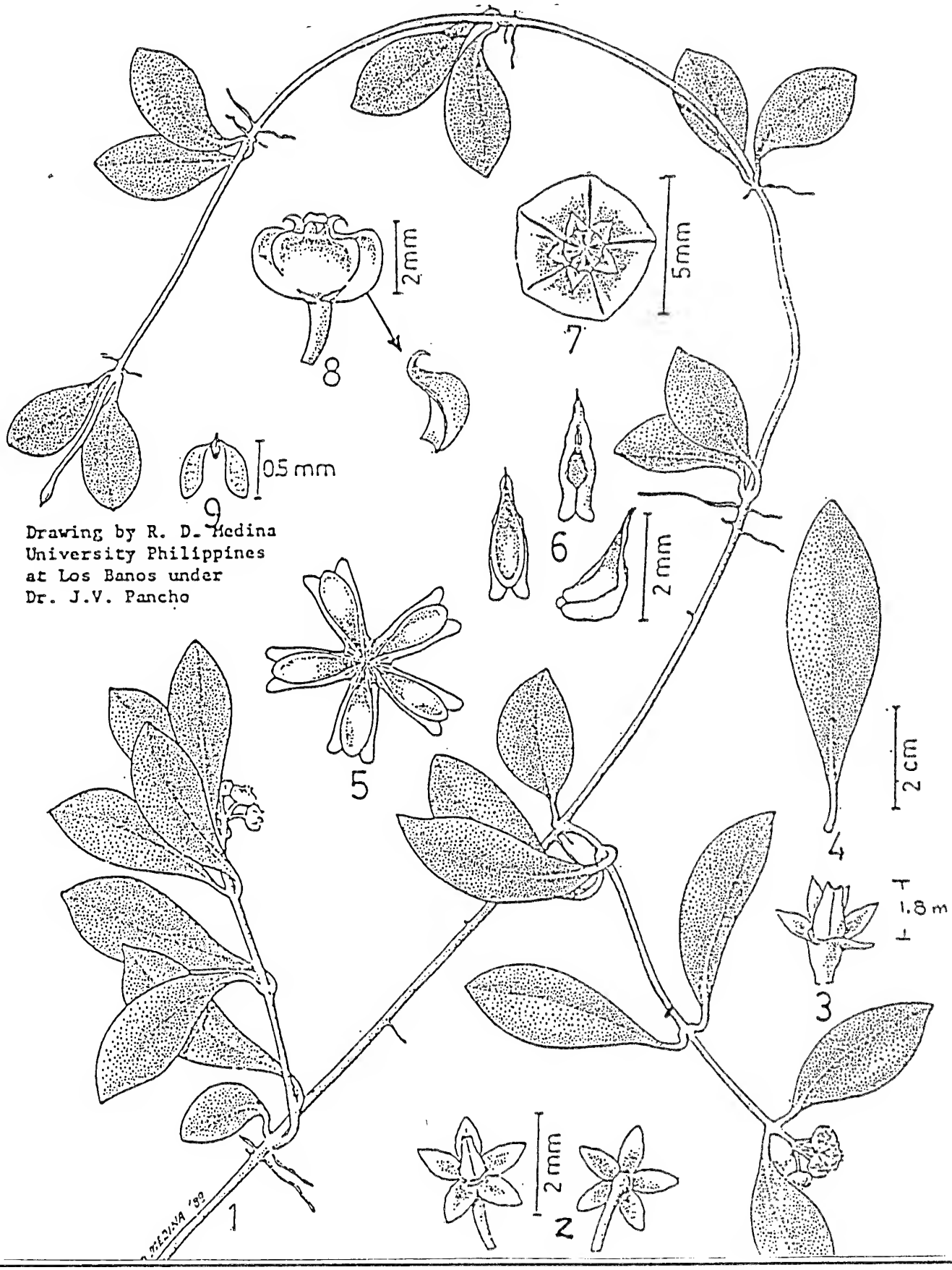
Hoya halconensis Kloppenburg in Fraterna 3rd. quarter 1990. Type #5674 (B). Collected by Elmer D. Merrill Nov. 1906 on Mt. Halcon, Mindanao, Philippines in a mossy forest at 900 m. altitude. Flowers with faint odor, purplish outside yellowish within.

Scandent, glabrous with stems to lead pencil diameter to 0.7 cm. long internodes 18 cm.. Foliage 9-12.5 cm. x 4-6 cm. with most small, spreading, glabrous, base broadly rounded, rather rectangular tapering slightly to the mucronate apex. Midrib visible above and below, lateral nerves obscure. Peduncle 3.0 cm. long, rachis perennial, enlarged about 0.5 cm. in diameter, rough and scaly. Pedicels long about 3.5 cm.. Calyx lobes 0.3 cm. long hairsute, broadly overlapping at the bases, ligule present. Corolla broadly ovate with a drawn out sharply acute apex, glabrous inside and out, cut to below the middle, flower flattened about 2 cm. in diameter. Coronal scale outer lobe raised, saddle shaped, with a longitudinal ridge the full length on top, beneath fully channeled, 1.0 cm., crown 1.0 cm. diameter, outer apex of scale narrowly rounded, inner lobe short, drawn narrowly out, anther apex exceeding inner lobe. Staminal column short. Pollinaria with long narrow pollinia, long translators, broad at pollinia attachment, long narrow retinaculum. The collecting locality of this species is presumed to be the same as for the species Hoya paziae. Key # 24



Hoya heuschkeliana Kloppenburg

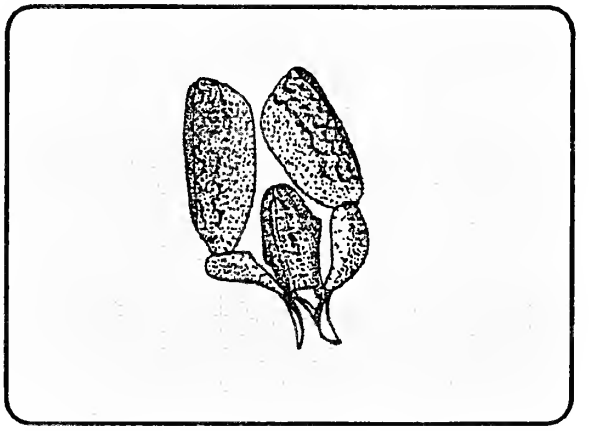
By R.D.K.



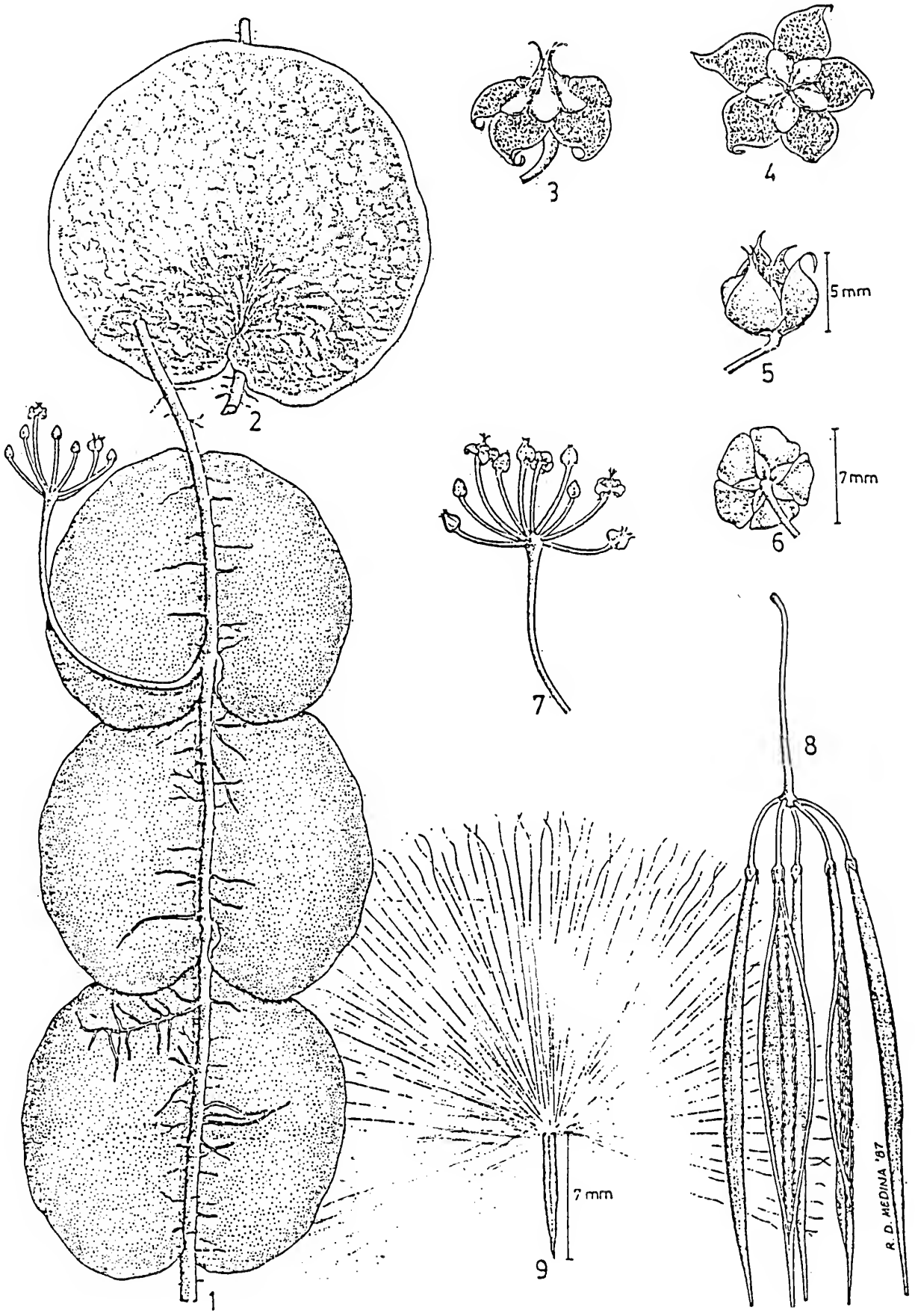
Drawing by R. D. Medina
University Philippines
at Los Banos under
Dr. J.V. Pancho

Hoya heuschkeliana Kloppenburg in The Hoyan Vol. 11 #1 part 2 pp. i- ii 1989. Type: #2175 (CAHP) collected by Professor Juan V. Pancho at the northern portion of Lake Bulusan, Sorsogon Prov., Luzon, Philippines. Epiphytic on trees at about 50 m. altitude, endemic.

An epiphytic or terrestrial small vine, twining and creeping. Its stem is puberlous, filiform with adventitious roots at the nodes. Foliage is enervis, petiolate, ovate-elliptic, with a obtuse base cuneate, carnose with numerous surface granules or punctations, 2.5 cm. long x 0.5-2 cm. wide at the middle, undersides lighter green and concave. The leaf color is dark green. Petioles are curved, pubescent about 0.4 cm. long. Umbels of 2-7 pale cream to rose tinted flowers, urceolate, but flattened 0.8 cm. in diameter. Peduncles stiff, terminal and axillary 0.5 cm. long. Pedicels also rigid 0.4 cm. long, expanding as they approach the calyx. Calyx lobes nearly free at the base, narrowly triangular, punctate 0.15 cm. long with one ligule at each lobe intersection. Corolla urceolate cut about 1/3 with the tips reflexed and glabrous inside, outside surface glabrous and punctate, inside except for tip velvety puberlous ovate with acute apex 0.23 cm. long. Corona lobes thin, compressed, tapering outward from the centers, inner apex extended upward and narrowly elongated with a sharply acute apex, outer lobe broad, rounded with apex bilobed extensions which are typical of the Acanthostemma section. Extensions are broad and flat tapering inward at a 45 degree angle, ends are rounded, 0.2 cm. beyond outer scale apex. Anther appendages not exceeding apex of inner lobe. Stigma base 5 rotate and bifid at each rotate edge, columnar and capitate with central extensions. Ovaries are urn shaped 0.18 cm. tall. Pollinia 0.05 cm. long, relatively short and broad, outer apex tapering inward at a 45 degree angle, keeled, no vacuole present. Keel not extending to pollinia attachment point, narrow at translator. Retinaculum with broad inner apex, split at lower outer apex. Key # 16



Hoya imbricata var. basicordata

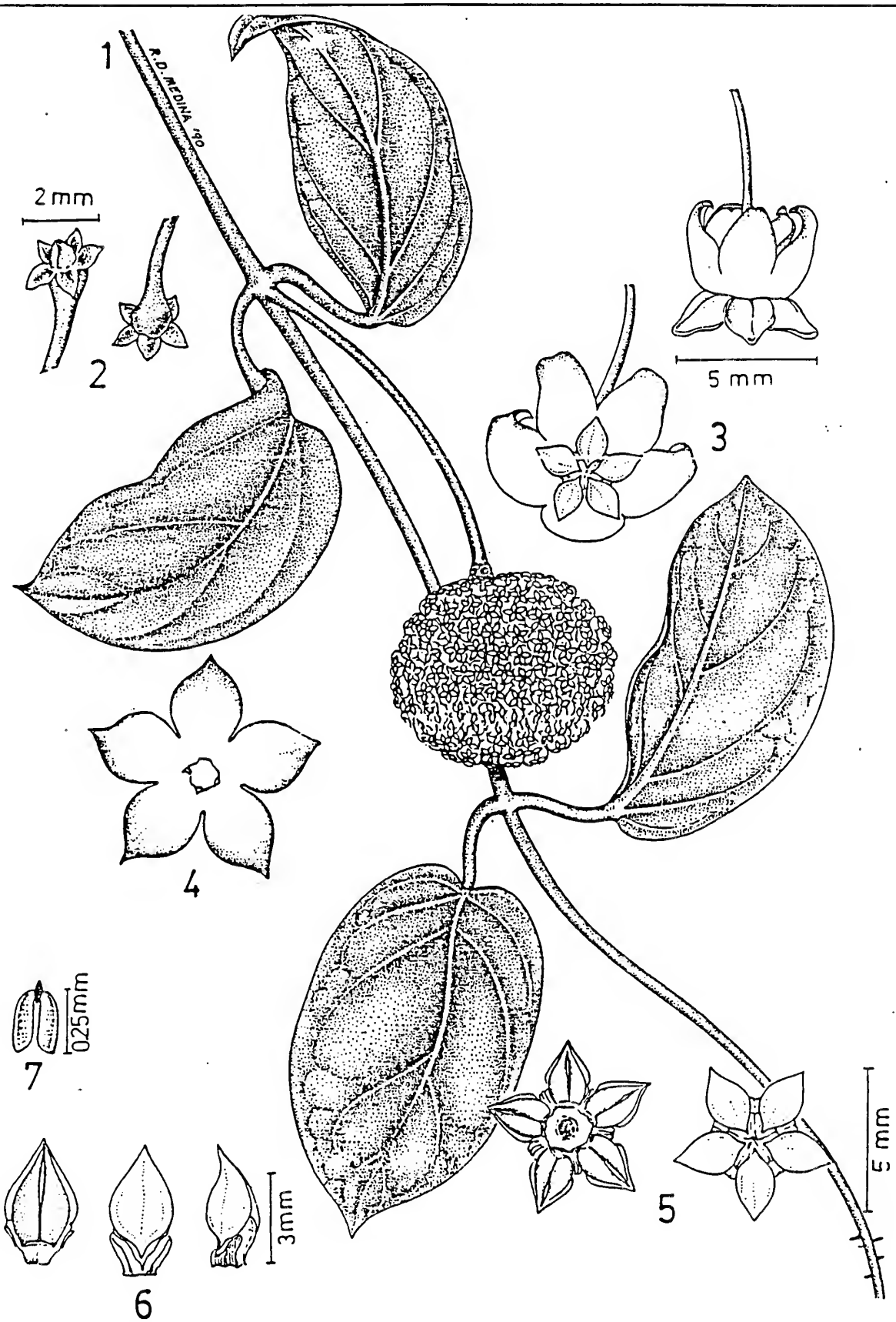


Hoya imbricata Decaisne in D. C. Prod. Vol. 8 (1844) p. 637. Section: Pelostemma. Type: speciman at the Paris Museum Herbarium.

Epiphytic, climbing, rooting especially at the nodes, one leaf aborting or not formed, the remaining leaf convex on upper surface and appressing closely to tree trunks, imbricte, orbicular, 8-10 cm. in diameter or more, upper surface rough, sparse ciliation, channeled slightly on the variety "basi-cordata" , with an acute mucronate tip, the under surface purple in color ,concave, finely granulose, sparse cilia mostly along the almost enclosed midrib and around the point of attachment to the stem, veinless, mat of fine rootlets attaching themselves to the tree trunks. Peduncles axillary 10 cm. long, rachis enlarged and scarred. Umbel geotropic, concave, many fuzzy cream flowers. Pedicels glabrous, curved, variable length, flexuose, green . Calyx lobes narrow elliptic, apex very acute, reaching corolla sinus, glabrous. Corolla, 0.8-1.0 cm. in diameter, reflexed, slender, pointed, glabrous outside, inside surface densely ciliate. Corona lobes convex, above margins revolute, inner apex stretched upward and forward at a steep angle, outer portion broad and rounded. Retinacula visible in open flowers. Anther appendages very long overtopping inner corona apex noticeably, the 5 apices fanning out. Seed brown narrow, 0.7 cm. long outer apex sharply acute, base attached to long silky coma about 1.4 cm. long. Pods linear tapering to both ends, glabrous, straight to slightly curved, distal apex slenderly acute. Collected at Luzon (Botoc, Rizal, Laguna), Busuanga. On trunks of trees at low altitudes. Key # 6

Delessert, Icones Selectorum Vol. 5 (1846) p.37; Zollinger and Miquel, Flora Von Nederlandsch Indie Vol. 2 (1856) p.520; Naves in Blanco Flora Philippines (1877-83) t. 212; F.-Vill. Novis. App. (1880) p.135; Linnean Society of London, Translations Botany (1888-94) p.495; De Nuttige Plantae Von Nederlandsch Indie p.248; Bulletin des Jardin Botanique Series 3 Vol. 2 (1920) pp. 247-8; Quisumbing, Medicinal Plants of the Philippines (1951) p.22; Perkins, Fragmentia Florae Philippines (1904) p.130; Philippine Journal of Science #3 Vol. 15 (1919) pp.262-7; Enumeration of Philippine Flowering Plants Vol.3 (1923) p.252; E.D. Merrill, Plant life of the Pacific World (1944), p.98 fig.91; Leafletts of Philippine Botany Vol. 10 (1938) Art. 131, p.3581-2.

Merrill #2363 1903 (A); Vanoverbergh #2161; Ramos #41265 1907 (pseudo maxima), #41223, #22089 1913, #970; Elmer #15802 1916 (A); Copeland #399 (1904); McGregor #18893 (var. basi.); Edano #24910 1916 (var. basi.), #34523 1956 (PNH,A), #11015 1949 (BO, PNH); Mendoza #91296 1964 PNH), #91238 1964 PNH); Steiner #40033 1959 (PNH); McVittie & Carran #13835 1950 (PNH); Paniza #9395 1949 (PNH); Wayet #41559 1986 (var. basi.) (CAHUP); Vichanco #2239 1951 (CAHUP), #2241 1949 (CAHUP); Villaraza #2242 1913 (CAHUP); Loher No # 1909 (UC), No # 1912 (UC); Piper #133 1911; Koorders #16119. #16204; Warburg #14388 (var.basi.), #15848 (maxima); Sarasin #360 1894. Schlechter #20405 1909 (maxima).



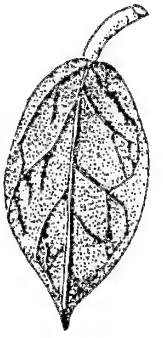
Hoya incrassata: 1. Flowering stem; 2. sepal, front & back view; 3. flower, 2 views; 4. petal; 5. corona, 2 views; 6. corona scale, 3 views; 7. pollinia
Line drawing by R.D. Medina

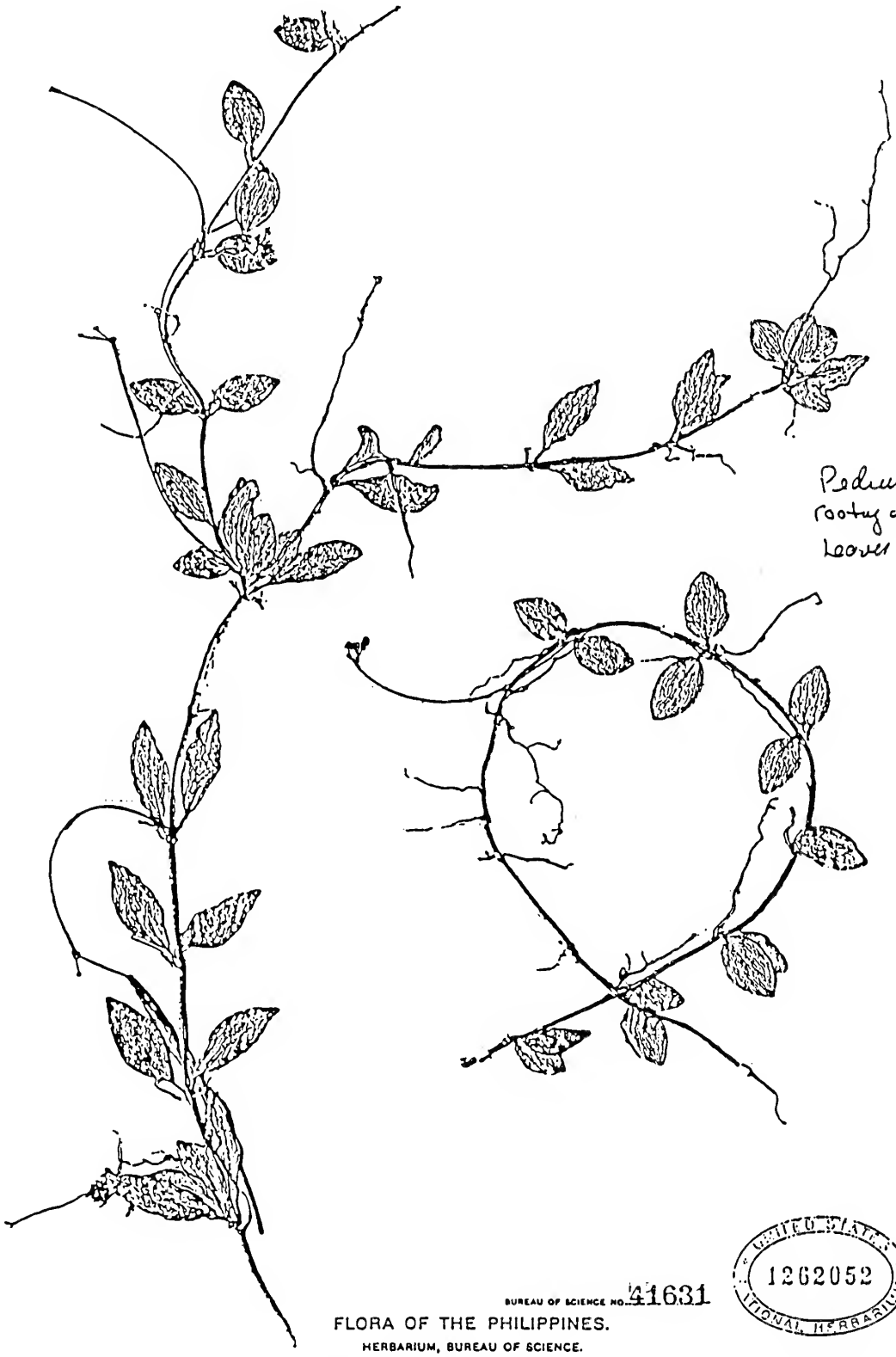
Hoya incrassata Warb. in Perkins Frag. Fl. Philippineae (1904) 130 .Type: Warburg #12997, #12998. Sampaloc, Tayabas, Quezon Prov.,, Luzon. Syn. Hoya reticulata Merrill in Philip. Jour. Sci. Vol 17 (1921) p.311 Syn. non. val. Hoya orientalis P.T. Li, in Bul. Bot. Res. (1984) p.121

Branches 0.5 cm. in diameter, glabrous, with dot like elevated lenticles, nodes thickened. Petioles about 2 cm. long, 0.5-0.6 cm. wide, leaves thick and coriaceous, ovate to oblong, 9-14 cm. long, 5-6 cm. wide, bases rounded or a little subcordate, apexes acuminate, acute, glabrous and shiny above, costa beneath prominent, veins on both sides, 4-5 spreading, curving and meeting before reaching the margins. Peduncles 8 cm. long, rachis scarred 0.4 cm. diam.. Pedicels filiform 0.14-0.17 cm. long. Sepal 0.1 cm. long, broadly triangular rounded, obtuse tip, outside granulose; inside concave minutely ciliate, two adjacent sepals have 1 ligule each, others have 2 each, edge of sepal is membranaceous and with a few ciliate cells. Umbel globose, compact, with as many as 60 flowers per cluster. Corolla outside is punctate-granulose; inside waxy glabrous, 0.14 cm. diameter, tip rolled in, corolla recurved down. Corona 0.8 cm. diameter, outer lobe tip incurved slightly, channeled below, forming a circular end at outer apex. Scale concave above with slight raise in center, linear lines around edge, center granulose or punctate, scale boatlike, inner lobe almost mucronate, extension subacute as viewed from the top, it is raised and separated from the anther appendage which is definitely lower. Scales separated by the linear divided crease and with a definite lobe on either side of this crease. Lobes exceed sinus which is deep cut. Sides of scales linerally lined. Scale width at widest 0.15 cm., thickest vertically 0.13 cm.. Pollinia outer lobe truncated inwardly (centrally), keel does not extend to caudicle, translators attached far down on retinacula. Retinacula relatively long with broad inner lobe. Stigma simple. Key # 31

Enumeration of Philippine Flowering Plants Vol. 3 (1923) p. 352; Sunyatsenia Vol. 3 #2/3 (1936) p. 172; Leafletts of Philippine Botany Vol. 10 Art. 131 (1938) p. 3581; Philippine Journal of Science, Botany #6 p. 220. The Hoyan Vol. 5 #1 (1983) p. 7-8 ; The Hoyan Vol. 7 #4 (1986) p. 90.

Merrill #4082 (US), #11591 1922; Weber #1003; Bolster #393; Elmer #14440, #16718 1915, as H. crassicaulis Elmer; Ramos #3257 (BS), #32384, #22822, #29232 #10431, #10336, #14730 (BS), #41223; Ramos & Pascasio #34530 1922 Ramos & Convocar #83385; Edano #46166 1923 (UC); Warburg #14387 (steril), #12998 1904, #12997 1904 CoType ; Wenzel #2613 1927 (BO,UC,A).





Peduncle 6 cm.
rooting at nodes
Leaves 2.5 × 1 cm

BUREAU OF SCIENCE NO. 41631

FLORA OF THE PHILIPPINES.

HERBARIUM, BUREAU OF SCIENCE.

UNITED STATES NATIONAL MUSEUM

Hoya

H. leytensis, Elmer CABALIAN

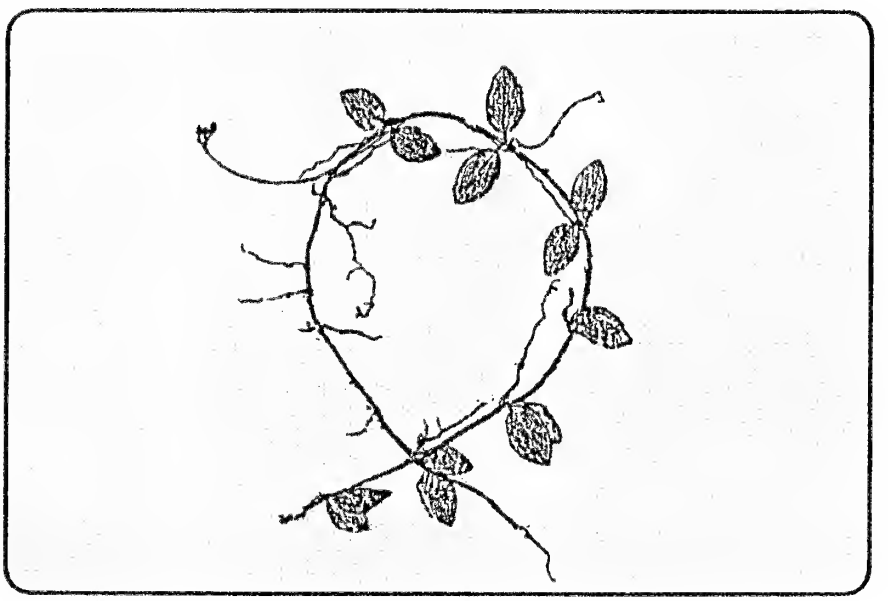
G. Lopez. LEYTE

Coll. ~~H. RAMOS~~ DEC. 1922

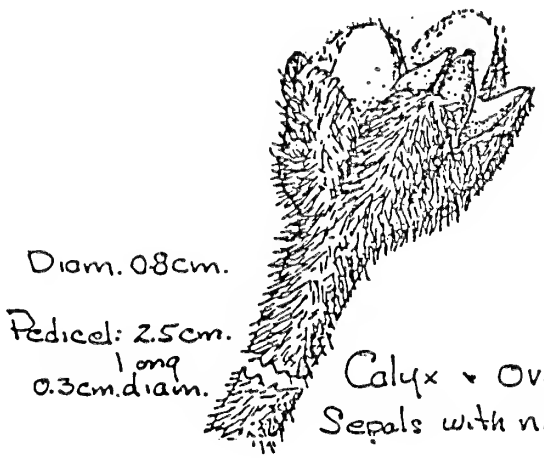
Hoya leytensis Elmer ex Burton in The Hoyan Vol. 10 Part 2 July 1988 p.i
Type: A.D.E. Elmer #7261, crawling along small tree branches near sea level at Palo, Leyte Jan. 1906. Syn. H. leytensis Elmer in leaflets of Philippine Botany Vol. 10 Art. 131 p. 3582. Section: Acanthostemma.

An epiphytic densely matted climber on tree trunks, much branched, glabrous, terete, minutely and densely tubricled, ultimate branches free and slender. Leaves coriaceous and subglaucous, glabrous, quite variable in size and shape, entire, narrowly oblong to round, most 2- 3.5 cm. long, 0.6-1.0 cm. wide. The rotund leaves 1.0 by 1.2 cm., the oblong blades tapering at both ends, obtuse to subacute, the round ones of course rounded, flat , midrib quite fine and obscure, more visible on the lower surface, lateral veins none, upper surface marked with fine transverse lines. Petioles 0.3-0.5 cm. long or much shorter, leaving orbicular scars when falling. Peduncles very slender 5 cm. long, geotropic umbels, rachis thickened. Umbel of dark to dull yellow flowers. Pedicels filiform 0.5-0.8 cm. long, glabrous. Calyx very small, segments hyaline, spreading, oblong with obtuse tips, 0.15 cm. long or shorter. Corolla united below the middle, upper half with acute apex, strongly reflexed, upper surface minutely puberulent, broadly ovate, column very short. Corona with bilobed scales at the apex and ciliated processes between the sinuses (a ciliated rim around the pistal), bluntly ovate to oblong. Pod very slender and linear, glabrous, pale brown, upon short pedicels, with persistent calyx, slenderly tapering at both ends, subterete, usually curved. Seeds pale brown 0.4 cm. long, flat and grooved along sides, gradually tapering from a bluntly tapered base to a truncated apex with tuft of whitish hairs. Key #21

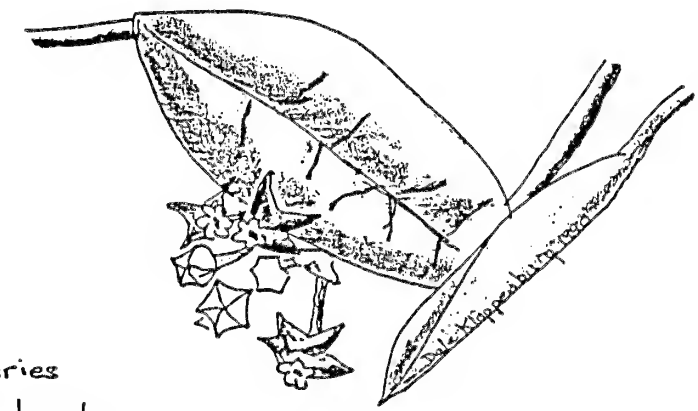
Wentzel #19333 at Dagami; Lopez #41631 at cabalian; Glassman #790 at Lake Bito 1945.



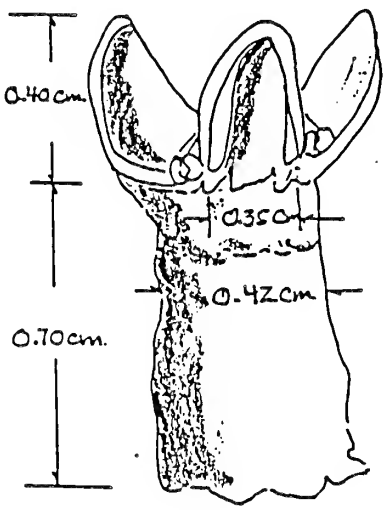
Hoya madulidii Kloppenburg Sp. nov. Holotype #357 (B) F.H. Bolster Surigao, Mindanao, Philippines
By Dale Kloppenburg 1990



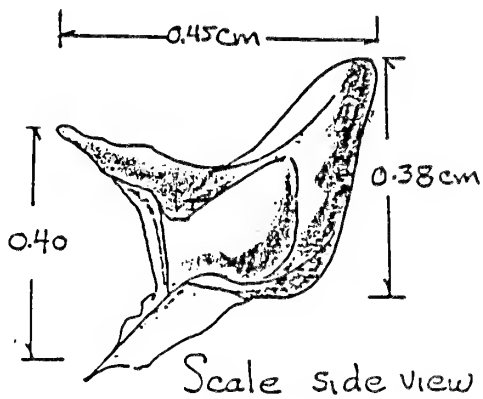
Calyx + Ovaries
Sepals with no liqules



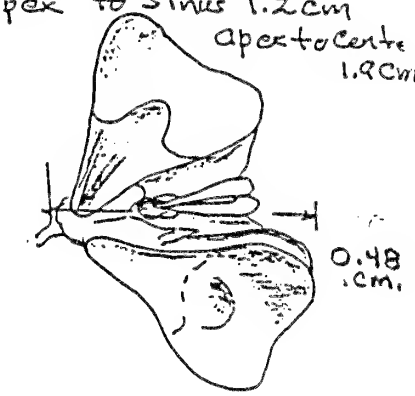
Flower Cluster
Corolla: 3.8 cm. dia. flat
apex strict.
Sinus to Sinus 1cm.
apex to Sinus 1.2cm



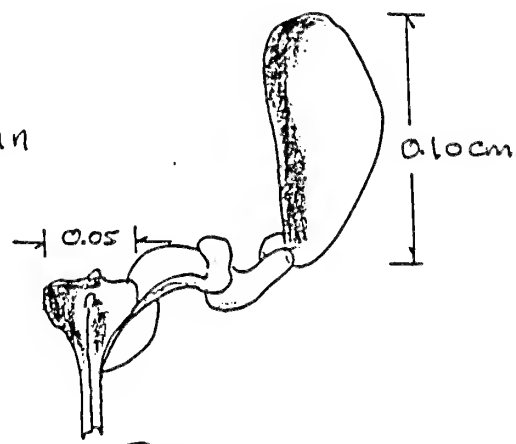
Scale end + Column



Scale side view



Scale - top view



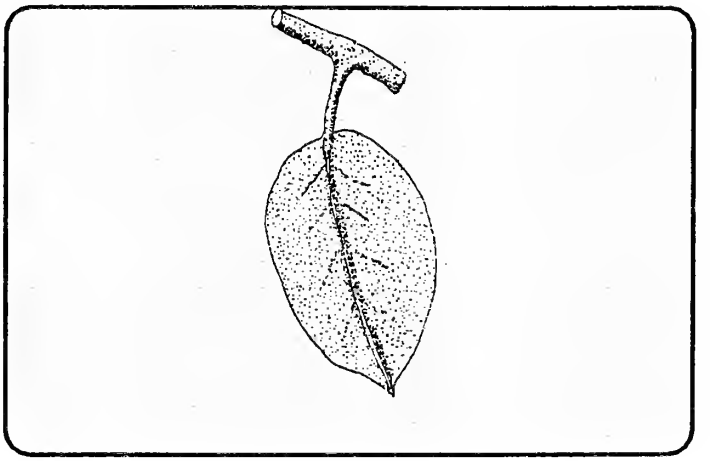
Pollinaria

Stigma
Side View

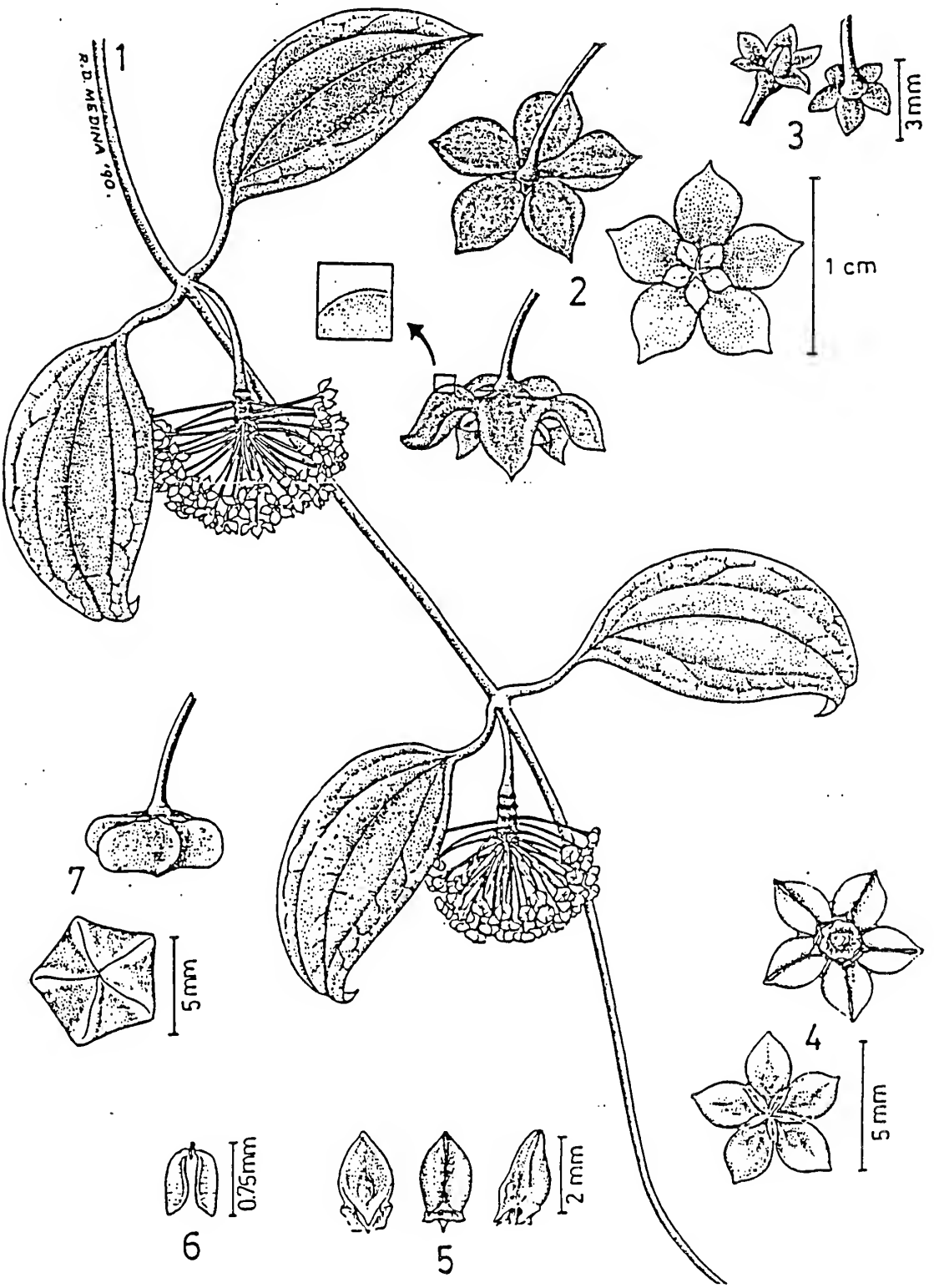
Hoya madulidii Kloppenburg in Fraterna Vol. 1 3rd. quarter 1990. Type: #357 Bolster (B) isotype (UC) found at 400' altitude, hanging from trees over the river, Surigao Province, Mindanao, Philippines. Eriostemma section, but with reflexed corolla.

A strong epiphytic vine, high climbing, carnose, pubescent to varying degrees, little branched, long internodes 13 cm., with nodes enlarged, dull green on newer growth, buff and woody on older portions, stems rather thick, foliage deciduous leaving large circular scars on falling. Petiole about 2.3 cm. long, curved, grooved above. Foliage pubescent on the undersides and especially heavy along the midrib areas, midrib prominent on lower side, grooved above, leaves concave below with margins recurved, nerves obscure. Peduncle short and heavy about 1-1.5 cm. long, 0.3-0.6 cm. in diameter, rachis of equal or greater diameter. Pedicel 2.5 cm. long, 0.3 cm. in diameter, densely pubescent, hairs 0.04 cm. long mostly pointing away from apex. Calyx segments oval, imbricate 2/3, approximately 0.4 cm. long and wide, pubescent same as pedicels, inside glazed with no ligules present, diameter about 0.8 cm. not flattened. Corolla large 3.8 cm. in diameter flat, sinus to sinus 1.0 cm., apex to sinus 1.9 cm., reflexed dark in color, purple to black, inside glabrous, punctate, outside puberlous, margins recurved, with straight acute apex, cilia on margins of outside surface, collar prominent, 0.46-0.52 cm. tall, inside ciliate especially the rim area, opening 0.45 cm. in diameter, outside glabrous but punctate, granular. Coronal scales outer lobes bent up with vertical outer end exposing the ungrooved under surface, 0.40 cm. tall, base width 0.35 cm., apex to apex 0.40 cm., between bases 0.26 cm., rounded and indented in central portion, inner lobe extended inward narrowing to round apex and relatively thin. Scales 0.45 cm. long, saddle shaped. The most prominent feature of this species is the massive moist, spongy column, 0.50-0.70 tall, 0.40-0.50 cm. in diameter. Anther appendages exceeding and covering the stigma which is a low, broad, shallow cone. Anther wings prominent with rounded outer apexes. Pollinaria with non keeled pollinia 0.10 cm. long, outer apex broadly rounded, inner narrower; translators broad and twisted, long, retinaculum with a broad head 0.05 cm. across with a small umbo and longitudinal ridge on top, short bifid outer apex. Key # 34

There are numerous herbarium sheets bearing the name Hoya coronarioides, the unpublished name on the type sheet of this species. I have studied many of them, but my determinations are not complete at this time.



Hoya mcgregorii Schlechter



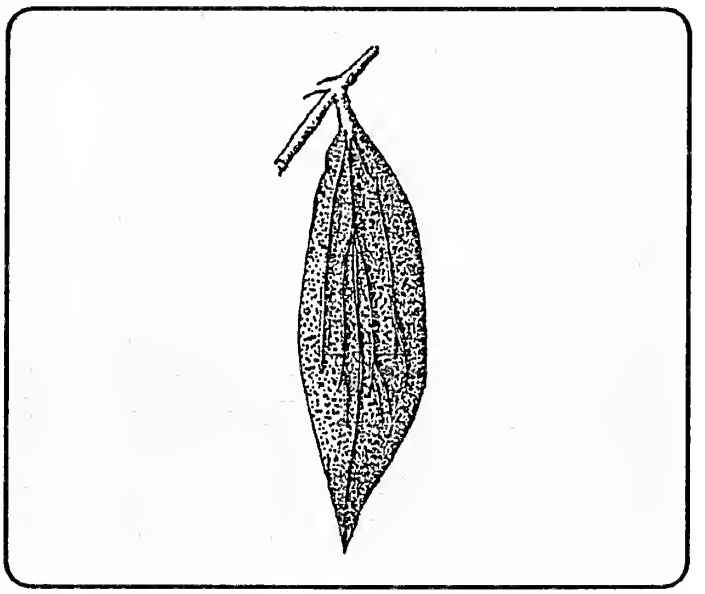
Hoya mcgregorii: 1. Flowering stems; 2. flower, 3 views; 3. sepal, 2 views; 4. corona, 2 views; 5. corona scale, 3 views; 6. pollinia; 7. young flower, 2 views.

Hoya mcgregorii Schlechter in Philippine Journal of Science I p. 302 supplement (1906). Type: McGregor #191, (B) April- May 1905, Baco River, Mindoro. Section: Eu-Hoya.

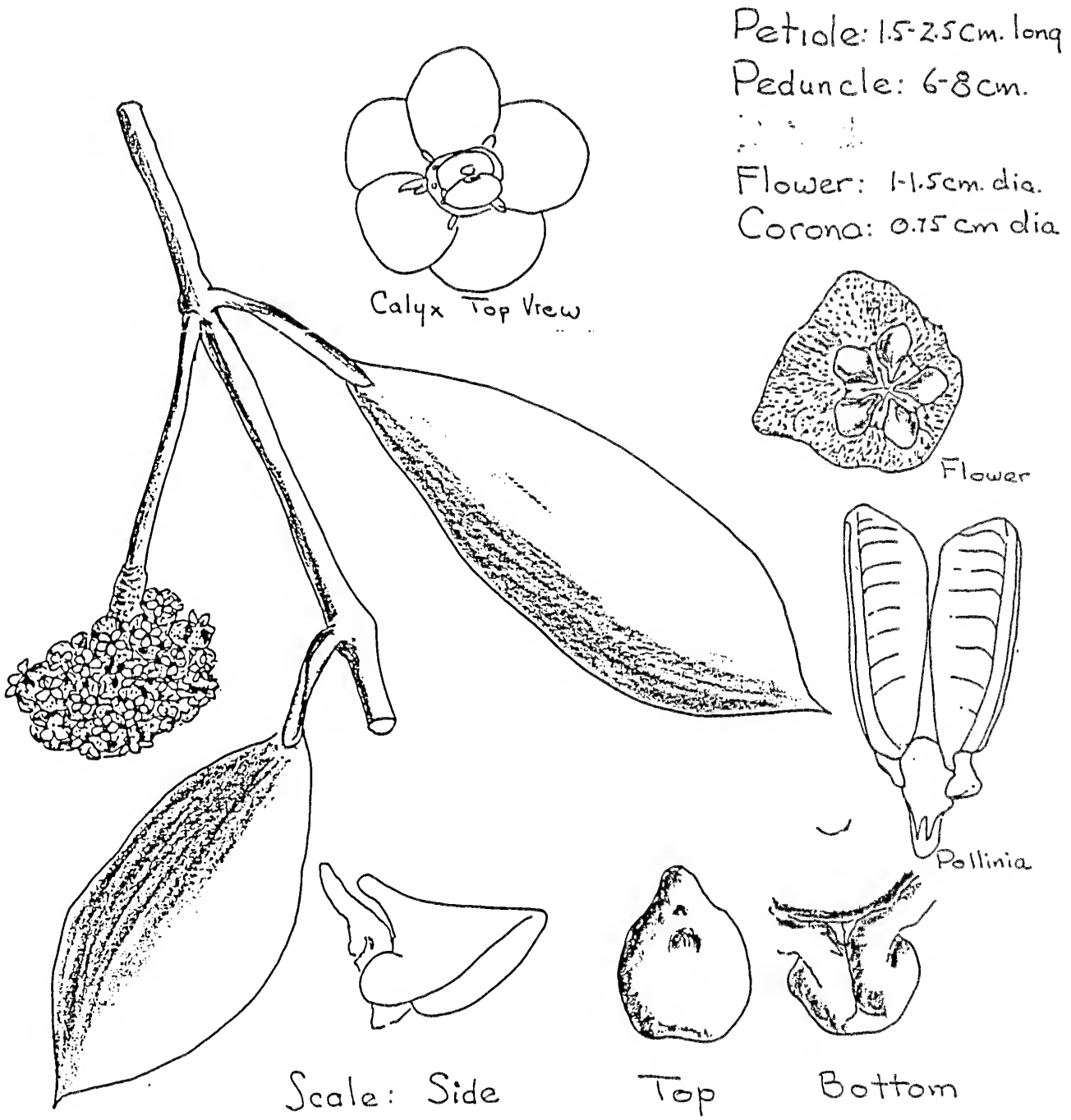
A high climbing branched epiphytic, stalk and branches filiform, flexible, glabrous, rooting, loosely leaved. Leaves widely spread, lanceolate-elliptic, acuminate, glabrous coriaceous; 7-11 cm. long 2.5 -3.5 cm. wide in the middle, triplinerved. Petiole fleshy, almost terete, glabrous, 4 cm. long. Pedicel slender, filiform, 1.3-1.8 cm. long, glabrous. Flowers like H. merrillii Schltr. similar and almost equal in size. Calyx lobes ovate obtuse, glabrous about 0.1 cm. long, ligule at each base. Corolla 0.6 cm. in diameter, united below the middle, outside glabrous, inside margins minutely granular-papillose, otherwise glabrous; lobes ovate triangular, acuminate. Corona inner lobes obovate, apex briefly beaked, outside lobe briefly excised, higher than inner lobe, expanded in the center, channeled below nearly to column. Anthers small over topping, margins flexible but firm and tough, falcate. Pollinia oblique, clavate. Translators small, retinacula oblong, minute. Found climbing along the middle of small tree trunks in damp forest, stems flexible, pale green, flower pale white with pink parts. Key # 14

Enumeration of Philippine Flowering Plants Vol. 3 (1923) p.352.

Elmer #17969, #13066 ? ; Ramos #45570 1926 (BO).



Hoya meliflua (Blanco) Merrill



Hoya meliflua (Blanco) Merrill in Flore de Filipinas (1837) pp. 202- 3; p.142 as Stepelia meliflua Blanco, by E.D. Merrill in Species Blanconaiae, Bureau of Science, Manila (1918) p. 318. Syn. H. luzonica Schlechter in K. Schum. & Lauterb., Nacht Fl. Deutsch Sudsee p.364.

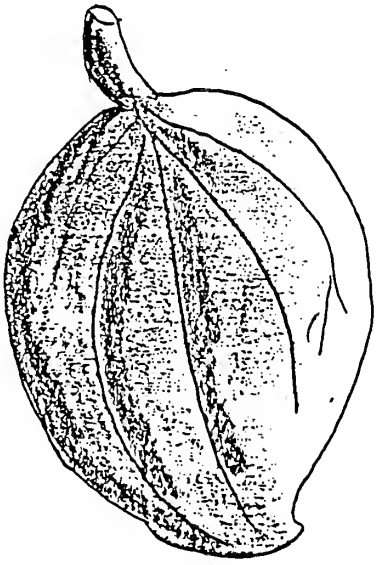
Dr. Merrill felt this species was synonymous with H. luzonica Schltr. because it was the only species of hoya grown in the gardens of Manila at the time (in Perkins Fragmentia Florae Philippinensis (1904) p.130.

A very rigidly branched heavy vine, usually overhanging cliffs or rock ledges along creeks and rivers at low altitudes, glabrous, leaves far apart, oblong obtuse, coriaceous and fleshy, 9-13 cm. long 5-6 cm. in the middle, apex slightly acuminate, nerves scarcely visible. Petiole glabrous, fleshy, curved, 1.5-2.5 cm. long. Umbel of many flowers (20), axillary, erect, subglobose, negatively geotropic. Peduncles fleshy, terete, glabrous, 6-8 cm. long. Pedicels erect, filiform, glabrous, 1-2 cm. long, thickened behind the calyx. Calyx lobes broadly ovate oblong, obtuse, somewhat orbicular, glabrous 0.3 cm. long, 0.3 cm. at widest, overlapping at base, one ligule at each base. Corolla 1-1.5 cm. in diameter, fleshy, lobes broadly triangular, outside glabrous, inside densely papillose, 0.6 cm. long, edges rolled and tip recurved, with age stained with nectar. Corona lobes thick with a collar, 0.3 cm long and 0.2 cm wide and deep, inner lobe erect with extended mucronate like tip, top concave except for umbo near outer apex, glabrous, below channeled, 0.75 cm. in diameter, anthers just exceeding inner lobe. Stigma head conical, base scalloped, striations to tip, which is filamentous. Pollinia with keel, very short translators, prominent retinaculum with wide angular inner apex, cleft in outer apex. Fruit capsule 12 cm. long 0.7 cm. wide. Seeds lanceolate, flattened out 0.6 x 0.15 cm., coma white 0.15 cm. long. Luzon (Apayao, Union, Rizal, Bataan, Laguna), Mindoro, Palawan, Negros, Leyte, Panay. Key # 25

Blanco, Flora de Filipinas (1845) Ed. 2 p. 142; Perkins, Fragmentia Florae Philippinea (1904) pp. 130-1; Philippine Journal of Science (1906) p.116; Merrill. Flora of Manila (1912) pp. 300-1; E.D. Merrill Species Blancoanare. Bur. Sci., Manila (1918) p.318; Enumeration of Philippine Flowering plants Vol. 3 (1923) pp.252-3; Leafletts of Philippine Botany Vol. 10 (1938) Art. 131 p.3583.

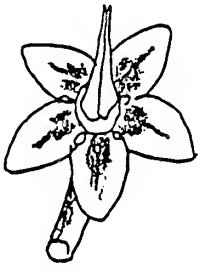
Merrill #2565, #2566, #7550, #9385 1913 (A), #11561 1922; Elmer #7262 (luzonica), 17782 (luzonica); Curan #13702; Villamil #20215; McGregor #22842; Warburg #13765 (type H.luzonica Schltr.); Edano #77895 (A). Ramos #39728 1921 (BO); Frake #36055 1957 (PNH); Conklin #80526 1963 (PNH); Pancho #41926 1989 (CAHUP); Ramos & Edano #49272 1927 (UC). Reyes #2245 1913 (CAHUP).

Hoya merrillii Schlechter Type #2218 Merrill May 1903 Polo Mindoro, Philippines
By Dale Kloppenburg 1990

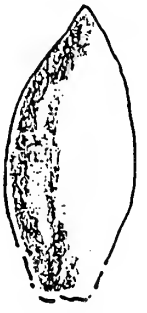


Dry Flower

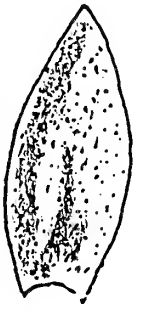
Sepal



Calyx + Ovules



Outer



Inner

Crown

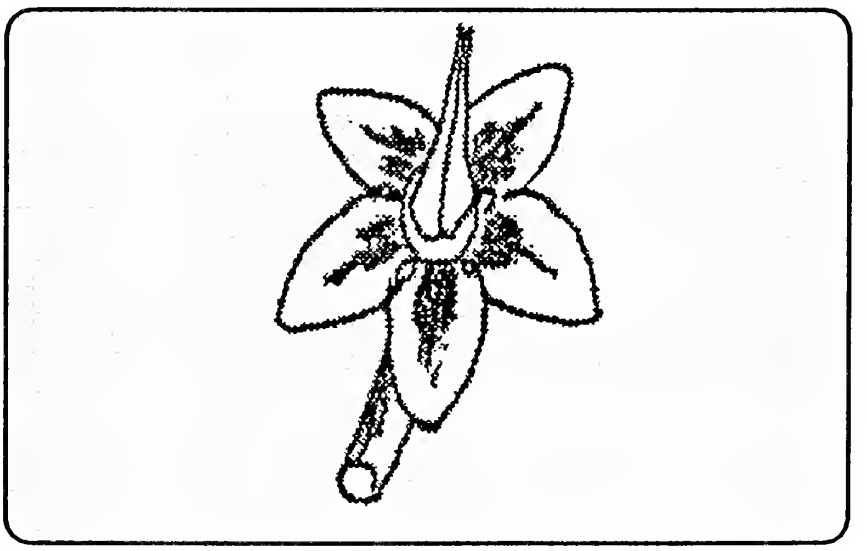
Ventral Dorsal Pollinia

Hoya merrillii Schlechter in Perkins Fragmentia Florae Philippinae (1904) p.1313. Type: Merrill # 2218 (B, A) at Palo, Mindoro Island May 1903. Section: Eu-Hoya

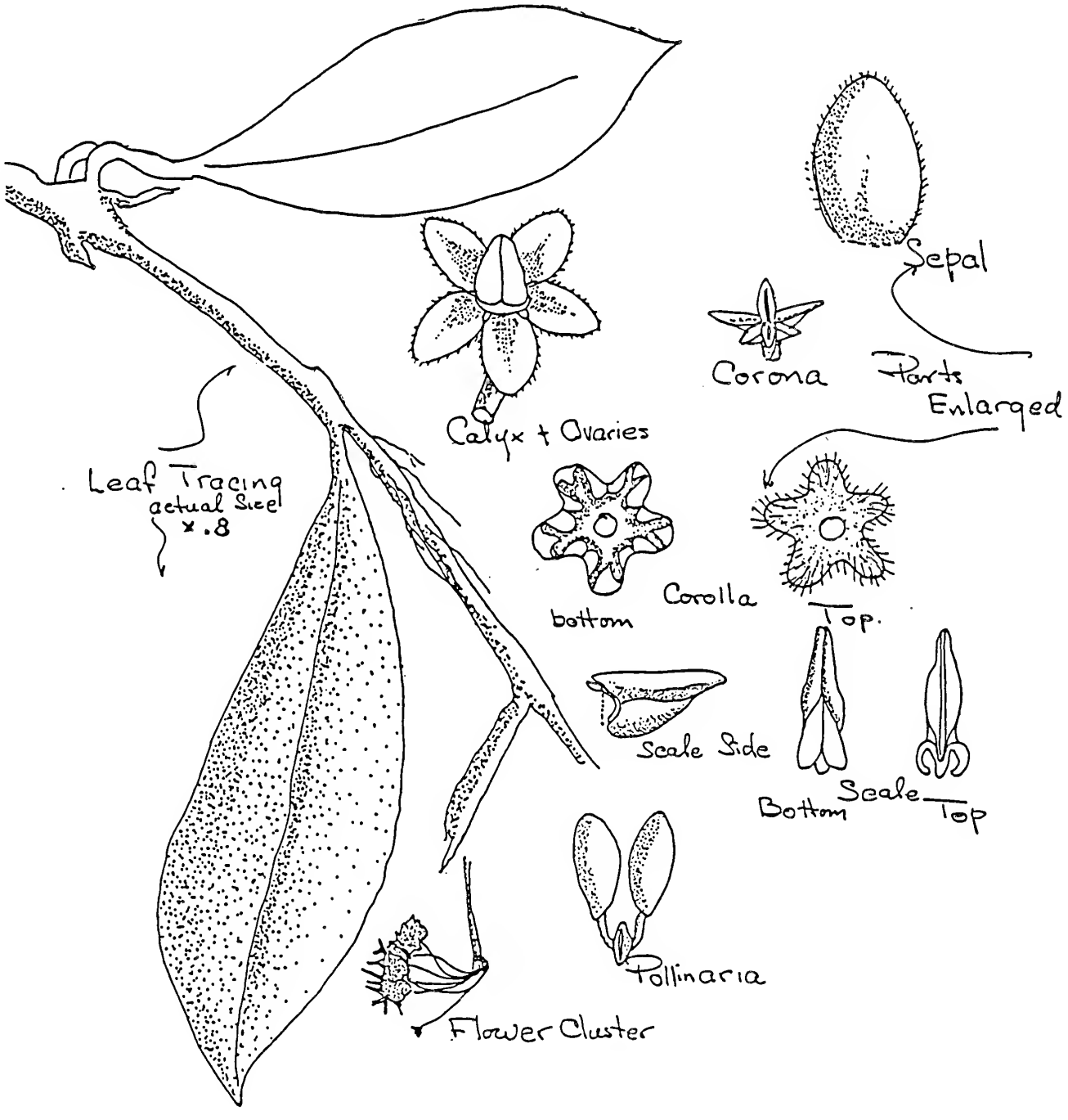
Vining epiphyte, branches filiform, terete, glabrous, rooting, leaves far apart, fleshy, light green, outspread, palmately veined, 3-5 nerved, ovate acuminate, glabrous on both sides, above waxy, 6-9 cm. long, below the middle 5-6 cm. wide. Petiole fleshy, 1.5 cm. long. Inflorescence axillary. Umble of 20-30 yellow flowers. Peduncle thick 2 cm. long, glabrous, rachis thickened. Pedicels filiform, about 2 cm. long, glabrous, expanded at the calyx. Calyx lobes short 0.15 cm. long shortly triangular, apex narrowly rounded, subacute, outside granulose, inside glabrous with a ligule at each slightly overlapping base. Corolla lobes oblong acute, outside glabrous, inside minutely puberlous 0.4 cm. long, 0.2 cm. wide in the middle, curved under along free edges, with tips often reflexed, pale yellow, flattened to 0.9-1.0 cm. diameter. Corona scales ascending slightly, about 0.3 cm. long, broad in the middle tapering to both apexes, top concave, bottom channeled, outer apex recurved slightly, exceeding corolla sinus. Anther appendages exceeding. Stigma head incurved, capitate, depressed, center hardened, small conical. Ovaries long, very narrowly tapering to a sharp apex. Pollinia with keel, retinacula plainly visible in open flower, as are the anther grooves. Translators swollen. Collected in Luzon (Nueva, Vizcaya, Tayabas, Cavite, Camerines), Mindoro, Panay, mindanao (davao). Tagalog name Sablak. Key # 9

Enumeration of Philippine Flowering Plants Vol. 3 (1923) p.353; Philippine Journal of Science Vol. 6 (1911) p.220.

Merrill #2218, #3365 (US); Copeland #627; Ramos & Dero #22547 (US); Mangubat #954 (US); Ramos & Edano #31508, #31504 1918 (BO,UC); Rosario & Cordero #95852 1965 (PNH); Sulit #6237 1948 (PNH), #17764 1953 (PNH); Conklin #17431 1953 (PNH); Quisumbing #2469 1947 (PNH); Hernandez #18682 1972 (CAHUP; Robinson #9013; #10431 ?.



Hoya mindorensis Schlechter Tracings from Type Sheet #332
By Dale Kloppenburg 1990

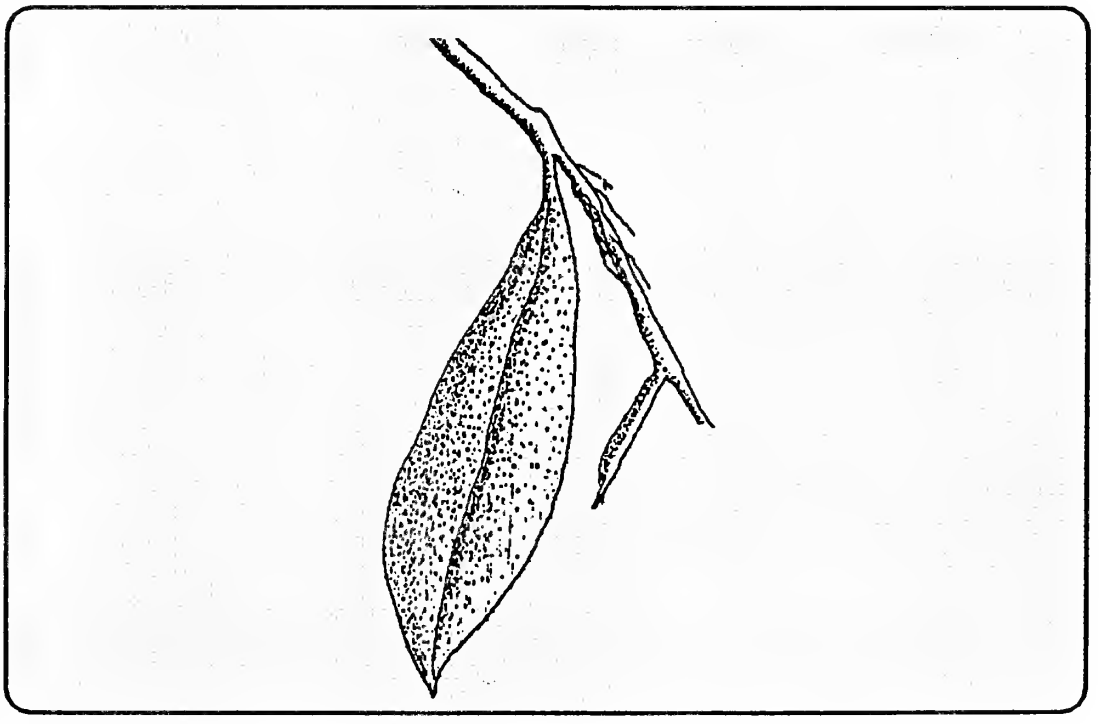


Hoya mindorensis Schlechter in Philippine Journal of Science Vol. 1 Supp. (1906) p.302. Type: McGregor #332 (B) at Baco River, Mindoro April-May 1905.

Epiphytic, few branched, rooting, terete, glabrous, loosely leafed, leaves outspread, orbiculate elliptical, shortly acuminate, glabrous, coriaceous, 9-12 cm. long, 3.5-4.5 cm. wide above the middle. Petiole somewhat terete, fleshy 2-2.5 cm. long. Inflorescence pedunculate, umbellate, many flowered, medium size. Peduncle terete, glabrous, about 2 cm. long. Pedicels thin, filimentous, glabrous, about 1.5 cm. long. Calyx segments ovate obtuse, minutely ciliate about 0.15 cm. long one ligule at each base. Corolla about 0.9 cm. in diameter, recurved, lobed to below the middle, outside glabrous, inside inner half puberulous, lobes pilose, sparsely hispid, ovate to somewhat obtuse, base both sides obtusely eared, apex of ears reflexed. Corona scales horizontal, above narrowly elliptic, inner apex acuminate, outer acute, middle longitudinally narrowly keeled between the apexes, below longitudinally channeled. Anther apexes exceeding a little, margin fleshy, falcate. Pollinia oblong, translators linear, about three times smaller, retinacula rhomboid, laterally compressed, much smaller than translators. The species has two auricles between corolla lobes and the pollinia are unusual. On trees at low altitudes. Key #26

Leafletts of Philippine Botany Vol. 10 Art. 131 (1938) p. 3586

Elmer #10267 at Dumaguete. Fenix #28222.



Hoya multiflora Blume in Cat. Gew.Buitens 49 ; Bijdr. 10 4. Section: Centrostemma.

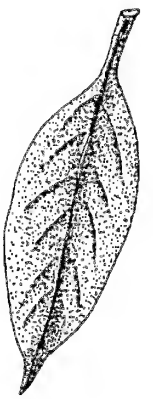
Terrestrial bushy plant, erect or suberect in habit, glabrous, branching usually from the base but occasionally higher up. Leaves oblong or elliptic 6-20 cm. long x 2-5 cm. wide, the apex acuminate, sharp apex, the base obtuse or cuneate, the midrib prominent on the lower side, channeled above, dark green above lighter below, lateral veins visible especially below, branching toward the margins. Petiole slightly curved, grooved above, about 1.5 cm. long. Peduncles rigid curved 1.5- 3 cm. long, green, glabrous, terete, nodal and terminal. Pedicels equal or longer in length to the peduncles, also green, fleshy, terete, glabrous perennial umble, much smaller in diameter than the stout peduncles. Calyx lobes 0.2-0.3 cm. long, ovate-obtuse, 0.17-0.25 cm. wide, ligules present, edges hyaline with a few short cilia occasionally present , otherwise glabrous inside and out. Corolla strongly reflexed, free lobes rolled under longitudinally, outside glabrous, inside fully and shortly punctate ciliate, with a ring of longer cilia at the edge of the collar. 0.10-0.25 cm., divided nearly to the base. Coronal scales very upright, waxy, inserted above the gynostigia, the 1/2 above adnate to the stigma, lower lobes tapering and bent outward from an extreme reflexed position, spur like, narrow, sulcate below, broadest at the beginning of attachment with a small umbo at this point on the upper surface. Inner lobes long, narrow, terminating in an acute ridged apex, a column below attachment area waxy, bilobed with rounded lower ends. Anther appendages small, well below the inner lobe apex, pollinia packet very thickened, inner lobe extending above and beyond the stigma. Stigma conical with small bifid apex. Pollinaria with long, narrow keeled pollinia, short translators, retinacula short, broad and bifid at their outer apex.

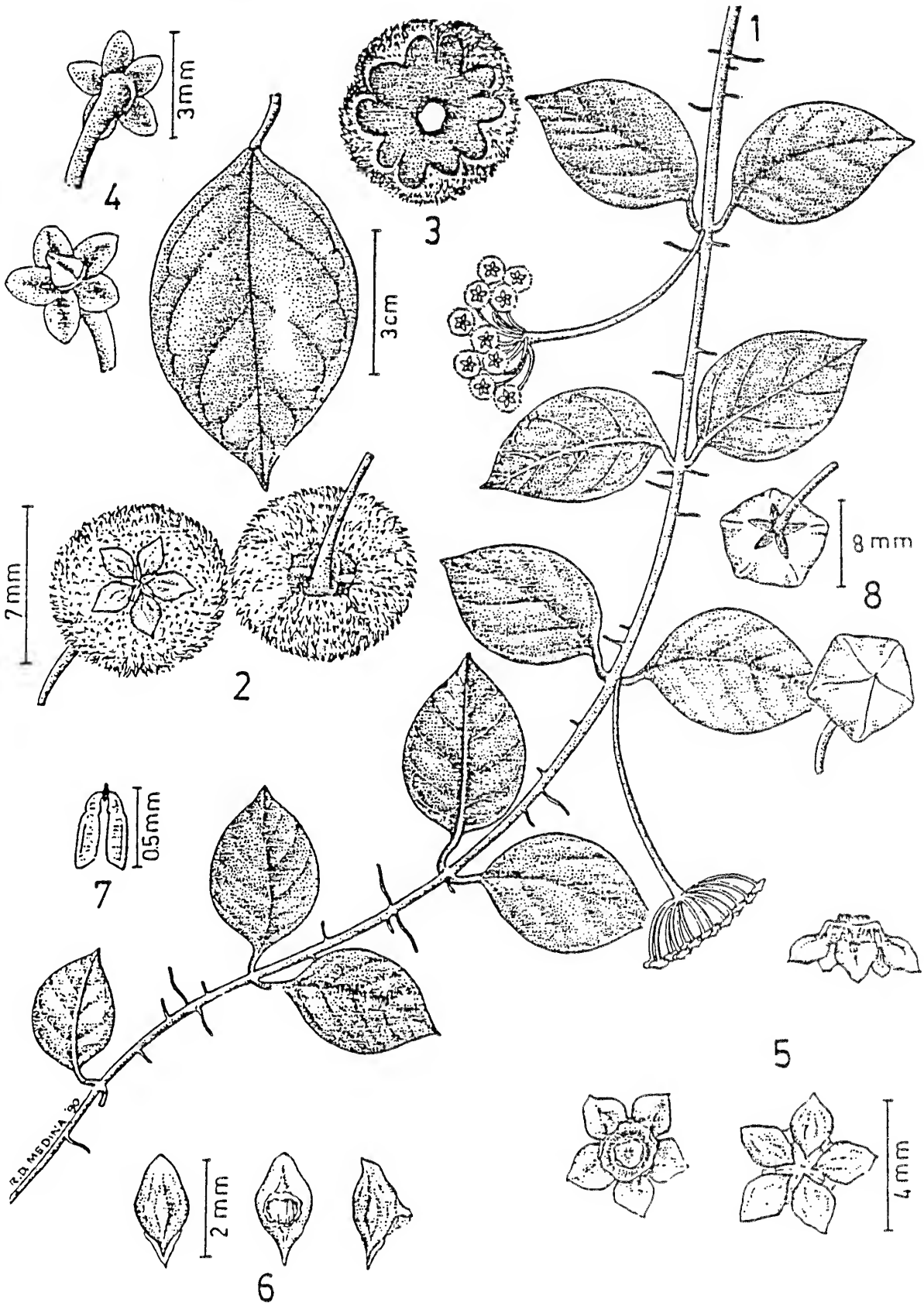
In the Philippines this species is highly variable in flower size, flaring of outer coronal lobes, color, retinaculum type and many other characters. A thorough study is needed to determine speciation. Found in the Philippines at Babayan Is. Luzon (most or all provinces), Polillo, Mindoro, Masbate, Tablas, Samar, Panay, Siargao, Dinagat, Mindanao. Epiphytic or pseudo epiphytic on trees in primary forests at low and medium altitudes. Key # 2

Blume Cat. Gewis. Buitenz. Vol.49 (1823); Caroli A. Linne, Equitis Systema Vegitabilum (1825) Vo.. 1 p. 843; Blume Bijdragen, Tot ut Flora Von Nederlandsch Inde (1826) p. 1064; Asclepias carnosa, Blanco, Fl. Filip. (1837) p. 208 ed. 2 (1845) p. 147, ed. 3 1 (1877) p. 263, t. 402 bis; Cyrtoceras reflexum Bennett in Horsfield's Plantae Javanica Rariores (1838) p. 90 t. 21; Centrostemma multiflorum Decne. in Ann. Sci. Nat. series 2 Vol. 9 (1838) p. 272; Hoya coriacea, Lindl. Botanical Register 25 (1839) T, 18 non Blume; Lindl. Bot. Reg. 26 (1839) Misc. (name corrected) (1840) p. 7; Dietrich, Synopsis Plantarum, 6, (1840) p. 892; Centrostemma lindleyanna, Descne in D.C. Prodramis Vol. 8 (1844) p. 634; Centrostemma multiflora, Tidjschrift Vor Naturilijke Geschiedns Vol .10 (1843) p.182; Centrostemma laurifolium, Museum Botanicum Lugdano-Batavorum Vol. 1 (1849) pp. 45-46; C. elegans, Annales Botanices Systematicae Vol. 3 (1852-1853) p. 63; Tuibouw Flora, Vol. 1 (1853) p. 72; Cyrtoceras elegans, #4, Miq. Flora Indea Batavia Vol. 2 (1856) p. 515; Cyrtoceras lindleyanum, #5, Miq. Fl. Ind. Bat. Vol. 2 (1858) p. 514; Cyrtoceras uncinatum Tijdr. Ned. Ind.(1862-63) p. 408. Sumatra in Nataurkunndig Tijdshrif voor Neder landandsch Indie; Hoya lindleyana, F. Vill. Noris App. (1880) p. 135; Vidal, Sinopsis Atlas (1883) P. 33 t. 68 f. G. Phos.; Hook. f. Fl. Brit. Ind. Vol. 4 (1883) p.52; Cuming, Philip. (1885) p. 125; Geo. Nicholson, Dictonary of Gar-

dening (1885); Vidal, Plantas Filipinas (1886) p. 189; Linnean Soc. of London, Translations Botany Vol. 3 (1888-1894); K. Schumann and Englar and Pratl. Pflanzenfamilein (1895) p. 289; Boerlage, Hand. Fl. Indie Vol. 2 (1899) p. 440. Perkens, Fragmentia Florae Philippines Vol.10 (1904) p. 131; Merrill in Philip. Jour. Sci. Vol. 1 (1906) supp. 119; Korders, Schumacher, Syst. Ver Java Vol. 1 (1910-1913); M. H. Le Conte Flore General DeL. Indo-Chine (1912); J. Constantin Flore General Del. Indo-Chine Vol. 4 (1912) pp. 128-129); Hoya reticulata Cost. J.constantin, Flore General Indo-Chine Vol. 4 (1912) p. 138; Merrill, Species Blanconae, in Bureau of Science (1918) Manila p. 317; Ridley, Flora of Malay Penninsula Vol. 2 (1923) p. 398; Merrill, Philippine Island Sci. Pub.18 (1923); Kew Bulletin (1926) p. 74; Centrostemma platypetalum Merrill in Sunyatsenia Vol. 2 #1 p. 16 (1934); Chun in Sunyatsenia Vol. 1 #4 (1934) p. 301; Tsiang in Sunyatsenia Vol. 3 (1936) p. 168-169; Van den Brink, Notes of the Flora of Java in Blumea Vol. 6 (1950) p. 379; Craib and Kerr, Florae Siamensis Enumeratio (1951) p.39; Phan Hring, Flora Du Vietnam (1960); Backer, Flora of Java Vol. 2 (1965) pp. 266-267; Co Mien Nam Viet Nam Vol. 2 (1972); Henderson, Malayan Wild Flowers, Dicots. pp. 229-232; Malayan Nature series (1974) p. 279; Giacinto Donna, Il Fior di Cera in Ann. Fac. Agri. (1974-1975) p. 341; Rintz, Flora of the Malayan Penin. (1978) p. 492-494; Translations of the Linnean Soc, 2nd series #3 p. 321; King and Gamble, Journal of the Royal Hort. Soc., Bengal Branch Vol. 74 #2 p. 561; Centrostemma micranthum, Mus. Bot, Lud-Bat Vol.1 p. 46 t. 12 Celebes; Koorders, Cyrtoceras laurifolium, Exkursimiflora p. 96-97; Hoya coreacea, Paxton's Magazine of Botany Vol. 7 p. 21; Hoya coreacea, Paxtons Mag. Bot. Vol. 6 p. 89; Maud, The Botanist, Vol. 4 t. 178; Baily, Cyclopedia of Hort. p. 1613; Dictionary of RHS; A.B. Graf ,Exotica; Innes, Complete Handbook of Succulents; Jacobsen, Handbook of Succulent Plants.

Philippine sheets: Merrill #1672 (1903) Antipolo, Rizal Prov, Luzon, #852, Bosoboso, Rizal Prov. Luzon, #1662, #317 (1918), Polo, Mindoro; Loher #4072, Bosoboso, Rizal Prov., Luzon; Rivera #10472 (1959) Laguna, Luzon; Saligam #28938 (1982) Laguna, Luzon; #2231 #2232 (1913) Pahil, Laguna, Luzon, #2230 (1913) Liluw, Laguna, Luzon; Lugod #8735 1957 Mt. Miquiling, Laguna, Luzon; Hernandez #18059 (1964) (UPLB), Laguna, Luzon, #17830 (1964) Molawin Cr. Laguna, Luzon, #12439 (UPLB), Laguna Luzon All seen at (CAHUP); The following seen at (UC) Ahern #258 (1904) Bosoboso, Luzon; Clemens #2013 (1924) Mt. Apo, Mindanao, #15620 (1924) San Andales, Luzon; Edano (1926) San Andales, Luzon, #48805 (1926) San Andales, Luzon ; Ramos & Edano #49514 #9545 (1927) Mt. Mayo, Mindanao; Lopez #42055 (1923) Mt. Angilong, Luzon; Elmer #15277 (1915) Mt. Bulusan, Luzon; Loher no number (19 15) Mt. Banahao, Tayabas, Luzon; McGregor #341 (1905) Badajoy Is. Tables.





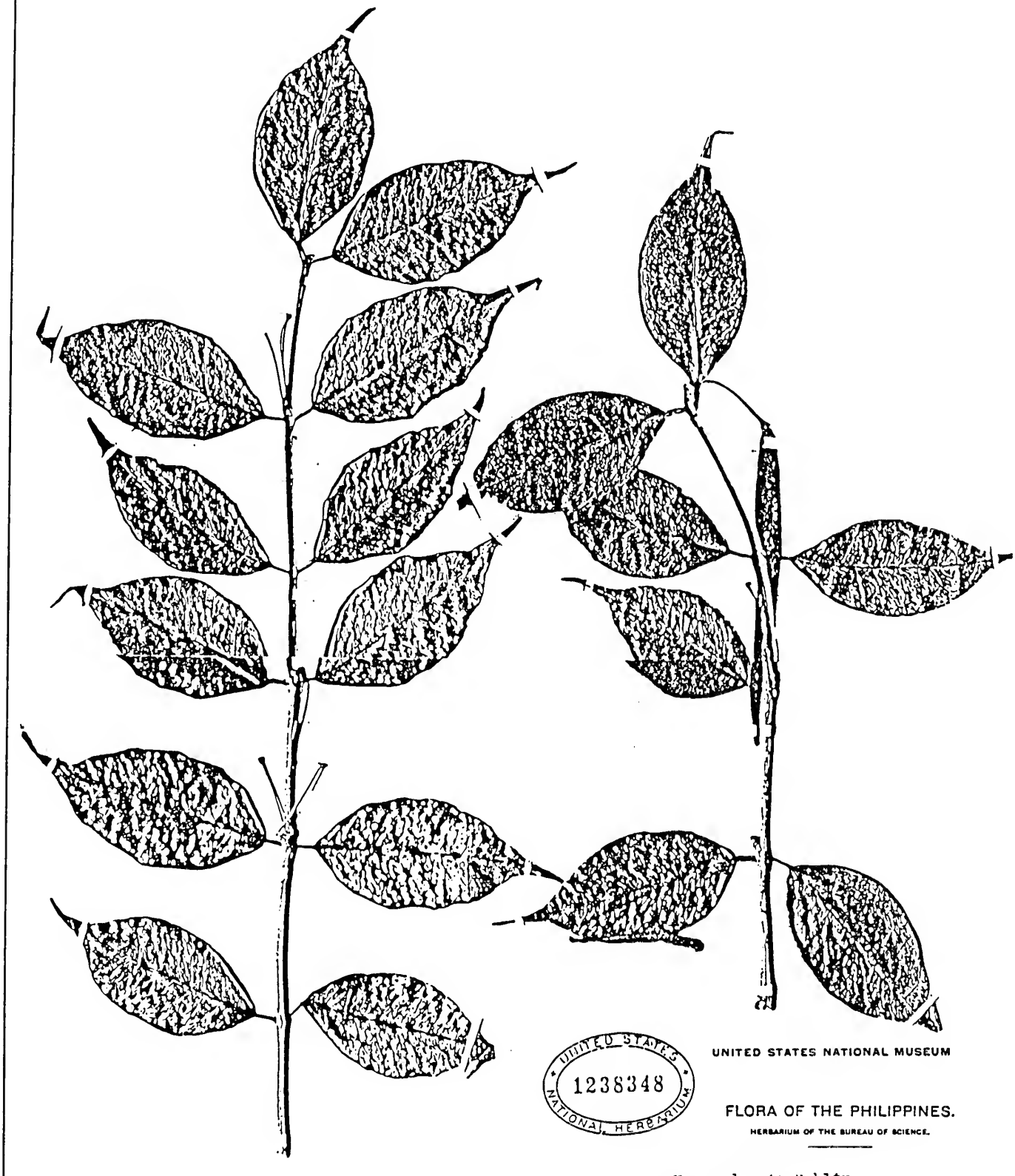
Hoya obscura: 1. Flowering stem; 2. flower, 2 views; 3. petals; 4. sepal, 2 views; 5. corona, 3 views; 6. corona scale, 3 views; 7. pollinia; 8. young flowers, 2 views

Hoya obscura Elmer ex. Burton. The Hoyan Vol. 8 #1, p.15 (1986) Type: Elmer #16719 (A) at Irosine (Mt. Bulusan), Sorsogon Prov., Luzon July 1916. Section: Otostemma.

Epiphytic, and very bushy. Stems branch readily from near the base which becomes woody with age, 0.5-0.8 cm. in diam., terete, glabrous, fleshy above. Stems rigid, eventually drooping, flattened or winged at branching nodes, adventitious short roots singly or paired arise along the internodes. Leaves opposite, compact to loose, glabrous, smooth and glossy especially on the upper side, entire, diverse in size but not in shape, flat elliptic to obovate oblong in the larger ones, smaller subelliptic blades 2-3 cm. others 10 cm. x 4 cm.. Apex acute to subacuminate, smaller leaves are broadly obtuse at the base; midrib not prominent, very shallowly depressed on the upper surface, straight from the base to the apex; lateral nerves faint, 3-5 on each side. Clones vary in their production of anthocynin pigmentation on exposure to sunlight or phosphate. Petioles: 0.5-1.0 cm. long or longer, glabrous. Peduncles: glabrous, stout, rigid, green, (as are all young stems), slightly curved from the leaf axils expanding at rachis. Pedicels: glabrous, 1.0 cm. long 0.08 cm. diam., green w/purple lenticles, curved forming a compact flat umbel. Calyx: segments membranaceous 0.1 cm. at widest 0.12 cm. tall. Triangular ligule at juncture of each sepal 3/4 as tall as distance to the overlap. Ovaries: stubby 0.15 cm tall and wide. Corolla: inside pubescent except for the acute tip, outside glabrous, recurved, 0.3 cm. at widest, 1.1 cm. diam. flattened, 0.4 cm. from sinus to corolla tip. Corona slightly elevated in center 0.62 cm. diam.. Scale 0.28 cm. long 0.15 cm. at widest, concave on top and saddle shaped with elongated umbo toward the inner lobe which is short and elevated, appendages below scale forming a small pedestal. Anther appendages exceed inner lobe. Stigma: tip granulose, coned in shape, supporting well developed base, linerally grooved. Pollinia 0.04 cm. long x 0.0014 cm. wide, base broadly rounded, outer tip beveled inward at 45 degree angle, keeled with little or no adjacent vacuole. Caudicles: broadly winged, parts ovoid. Retinacula 0.02 cm. long, narrow, tip covered, head rounded. Local name: Aputulibung (Bag.) Key # 36

Enumeration of Philip. Fl. Pl. Vol. 3, p. 352 (1923). Leaflets of Philip. Bot. Vol. 10, p. 3586 (1938). The Hoyan Vol. 6 #1, p. 8 (1984) ; Vol. 7, p. 61 (1985); Vol. 8 #1, p. 15 (1986).

Elmer #16719(UC,A), #17969 1917 (A); McGregor #22886, #11377; Edano #34521 Feb. 1956 Mt. Maliano, Luzon. Ramos & Edano #45454 1925 (UC).



UNITED STATES NATIONAL MUSEUM

FLORA OF THE PHILIPPINES.

HERBARIUM OF THE BUREAU OF SCIENCE.

Hoya odorata Schltr.

MT. MAQUILING
PROV. LAGUNA
LUZON
MARCH
E. D. MERRILL 1917

No. 8610
2—177

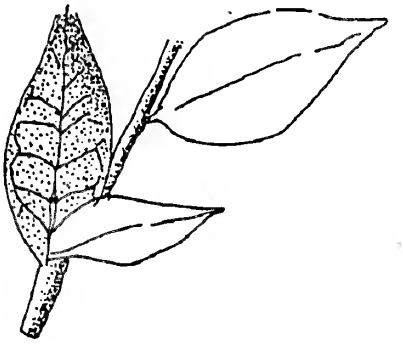
Hoya odorata Schlechter in Philippine Journal of Science Vol. 1 Supplement (1906) p.303. Type Merrill #3202 (B) (Jan. 1904) from Mt. Mariveles, Bataan Province, Luzon, in mossy forest at 4200' elevation.

A distinctive species, more of a bush than a vine, few branched, stems terete, glabrous, flexible, well leaved, becoming woody with age. Leaves erect and spreading, shortly petioled, elliptic or lanceolate-elliptic, acuminate, glabrous, thin, 3.5-5 cm. long in the middle 1.3- 2.2 cm. wide. Few flowers per umbel, waxy white with yellow-green corona, highly fragrant. Pedicels filiform, terete, glabrous about 2 cm. long. Calyx lobes lanceolate oblong obtuse, with sparsely ciliate margins, 0.2 cm. long, ligules present. Corolla rotate about 1.7 cm. in diameter, lobed to the middle, outside surface glabrous, inner surface very finely farinose papillose, lobes triangular ovate acute to almost acuminate, corolla at first reflexed, with high collar, then turning forward. Buds distinctive with longitudinal ridges where lobes meet, very pronounced nearing calyx. Corona lobes fleshy, horizontal, ovate, inner apex ascending and acute, outer apex very obtuse, top with longitudinal hump, below channeled, 0.4 cm. long, anther apex not exceeding inner scale apex. Pollinia oblique, club shaped. Collected at Batan Islands, Luzon (Ifugao, Bataan, Laguna, Sorsogon), Camiguin de Misamis. Key # 3

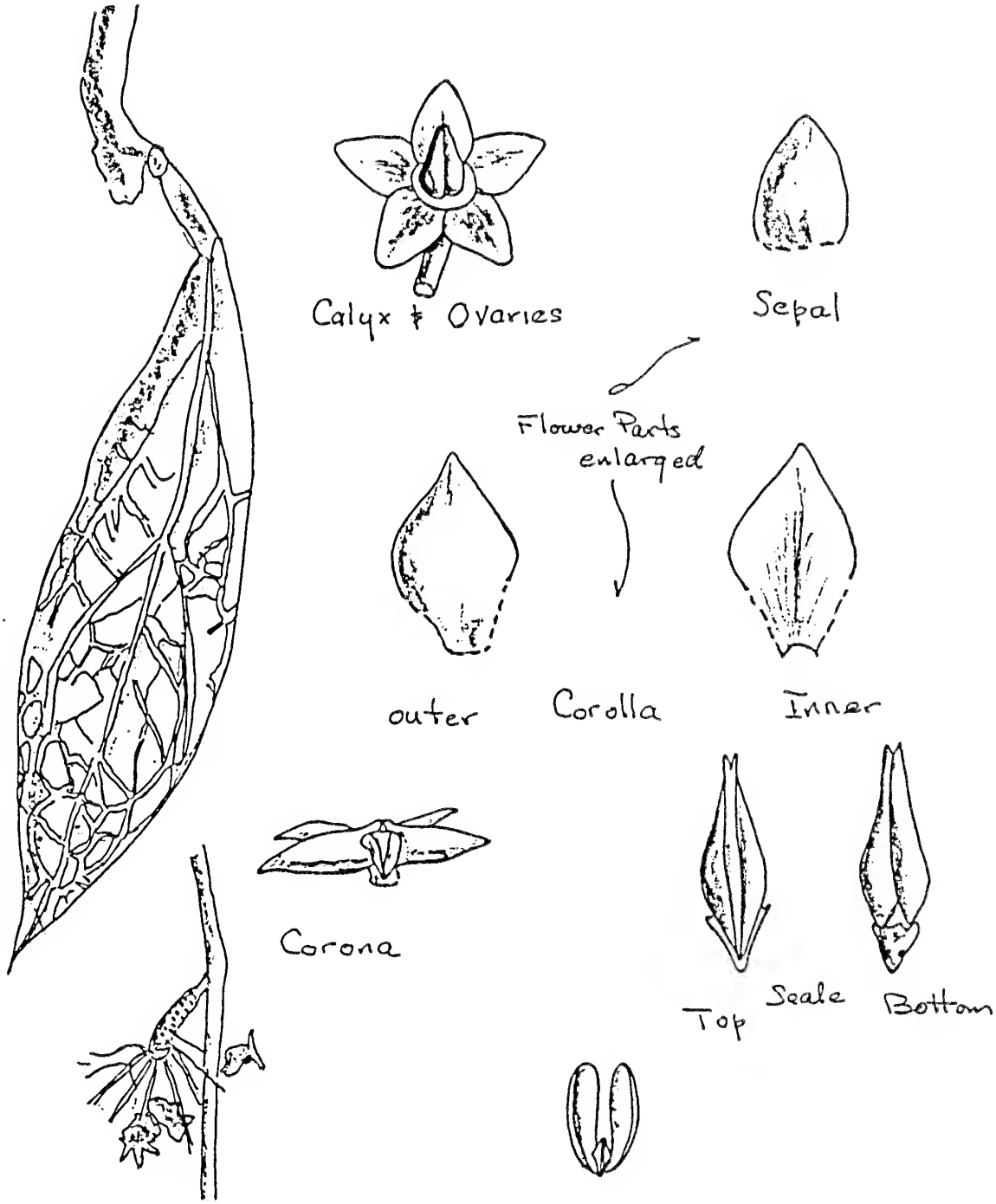
Enumeration of Philippine Flowering Plants (1923) p.333; The Philippine Journal of Science Vol. 3 #6 (1908) p.429; Leaflets of Philippine Botany Vol. 10 Art. 131 (1938) p.3587.

Elmer's description in this last publication does not seem to match Schlechter's Type description. There are two sheets of Schlechter's #5618, #5650, unpublished on which his drawings show flower parts that vary from each other and from H. odorata, but with similar foliage. I feel at the present time we have only one clone of this species in cultivation. There needs to be a critical examination of existing herbarium sheets, and new collections to determine if there are more than one species involved here. The sheet #18041 from Mt. Maquiling, Laguna appears identical with H. Paziae, Elmer's #5618 from Mindanao.

Elmer #9587, #17121, #18041 (BO,UC,A); Merrill #8610 1913; Brown #26670; Robinson #17093; Ramos #23683, #23656, #14663 1921; Edano #6706 (BO,UC,PNH,A), #6679 (PNH), #21980 1954 (PNH); Loher no # (UC), #13176 (UC); Salvoza #29638 (UC); ? #18041; Quisumbing #2243 1913 (CAHUP); Hernandez #19258 1968 (CAHUP); Briton #19549 1953 (PNH); Felix #3789.

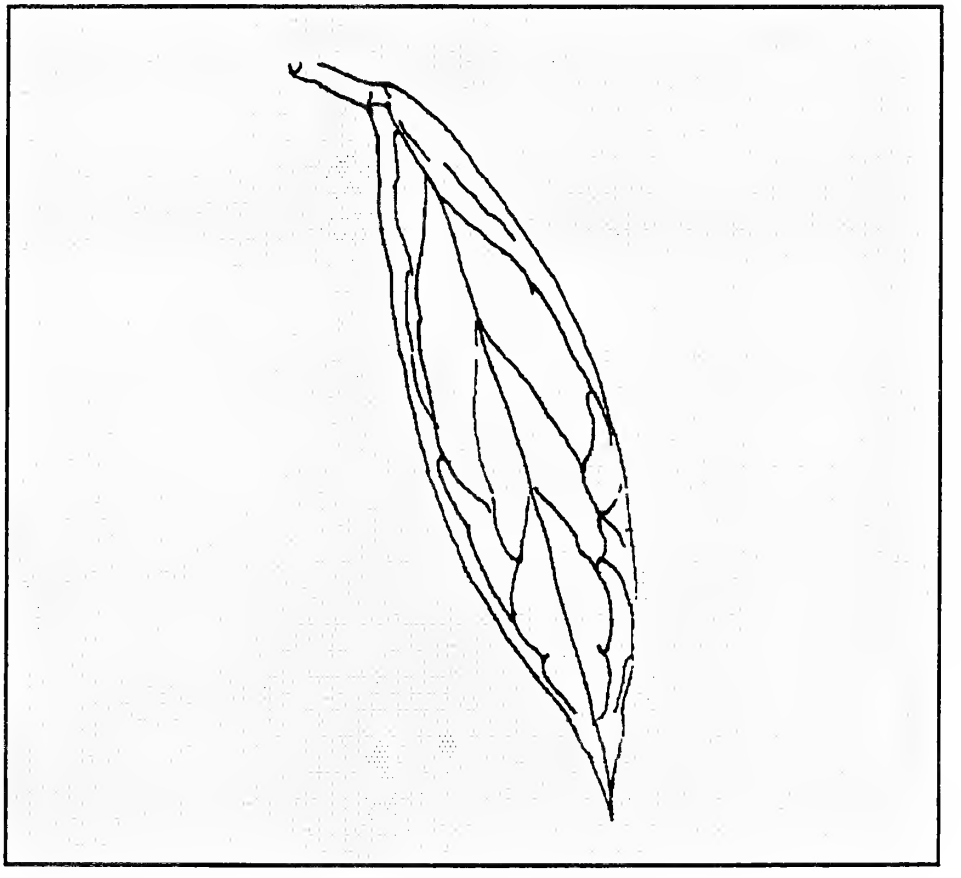


Tracings from Schlechter's H. palawanica sheet Collected by F.W. Foxworthy May 1906 Palawan Island, Philippines #834
By Dale Kloppenburg 1990



Hoya palawanica Kloppenburg in Fraterna Vol. 1 3rd. quarter 1990. Type: #834 of F.W. Foxworthy (B) found in borders of mangrove swamps on the island of Palawan May 1906. Hoya palawanica Schlechter unpublished.

Epiphytic and terrestrial entirely glabrous, fleshy, heavy stemmed with long internodes; around 14 cm. and 0.4 cm. in diameter, terminal branches thinner, thickened at the nodes. Petiole 1.8 cm. long x 0.6 cm. in diameter. Loosely leaved, outspread, distinctive, lanceolate-elliptic, 13.2 -14.5 cm. long in the middle, 3.8-4.2 cm. wide, deciduous, both surfaces glabrous. Nerves spreading, above prominent, 2-3 pairs at 60 degree to the midrib and joining marginal nerves 0.3- 0.6 cm. from the edges (reticulate- anastomosing). Peduncles very short, about 0.4 cm. long x 0.2 cm. in diameter, perennial. Pedicels very short, filiform, glabrous, straight, terete about 1 - 2.5 cm. long. Sepals broadly triangular, glabrous, with ligules present. Corolla cut to below the middle, lobes broadly triangular, apex acute, both surfaces glabrous. Corona distinctively longitudinally crested, long and relatively narrow, outer lobes descending gradually, inner lobes short and slightly ascending, outer apex split, fully channeled below. Pollinaria with short translators. Key # 11

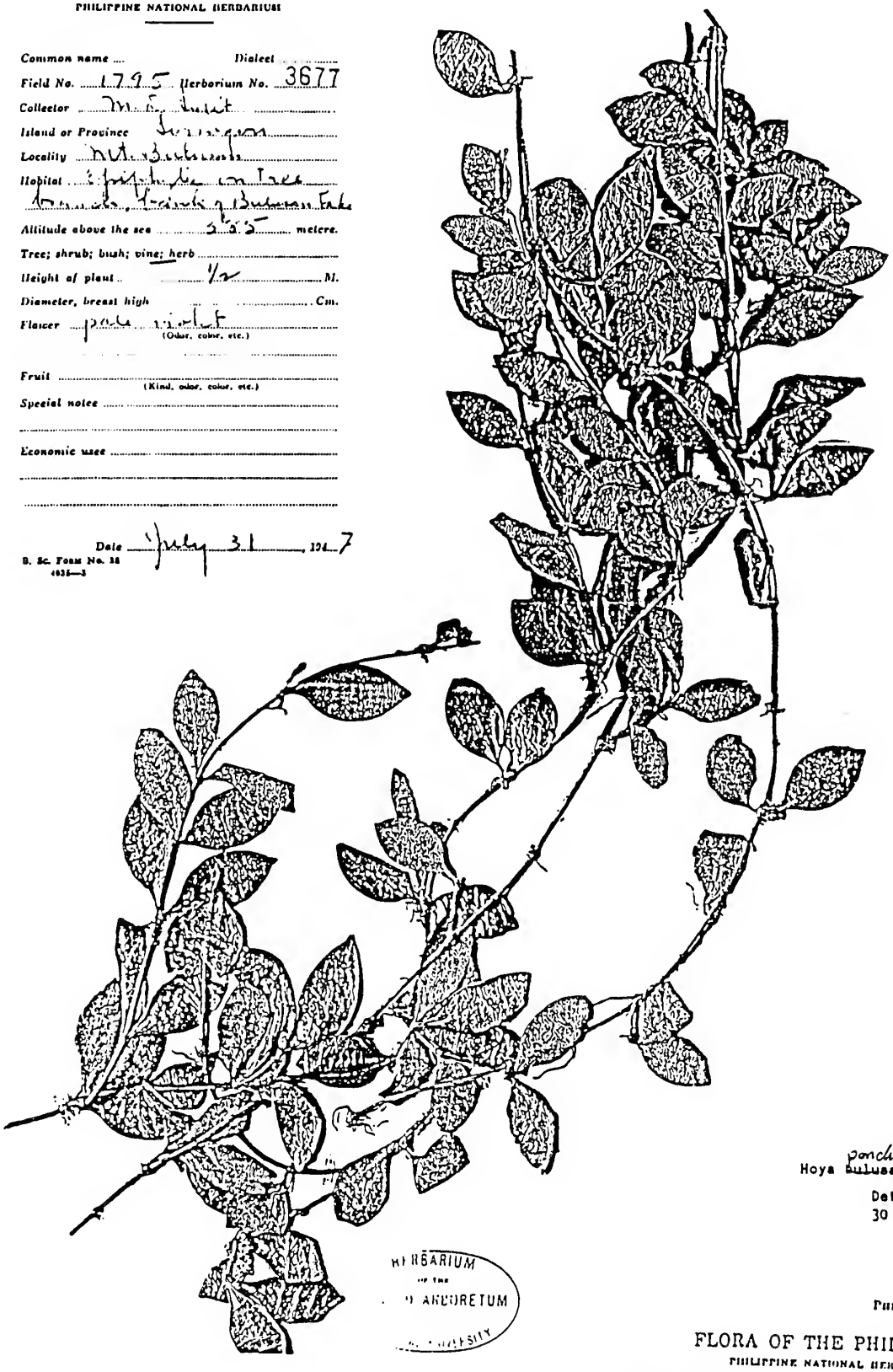


FLORA OF THE PHILIPPINES
PHILIPPINE NATIONAL HERBARIUM

Common name .... Dialect ....
Field No. 1795 Herbarium No. 3677
Collector M. E. Ruiz
Island or Province Sorsogon
Locality Mt. Bulusan
Habitat Epiphytic on trees
borders, trails & Bulusan Lake
Altitude above the sea 525 meters.
Tree; shrub; bush; vine; herb
Height of plant 1/2 M.
Diameter, breast high .... Cm.
Flower pale violet
(Odor, color, etc.)
Fruit ....
(Kind, odor, color, etc.)
Special notes ....
Economic uses ....

Date July 31, 1947

B. Sc. Form No. 38
4035—3



HERBARIUM
OF THE
ARBORETUM
UNIVERSITY

Hoya ponchoi, Kloppenburg
~~Hoya bulusanensis Elmer~~
Det. C.H. Burton
30 JAN 1986

PHIL. NAT. HERB. 3677

FLORA OF THE PHILIPPINES
PHILIPPINE NATIONAL HERBARIUM

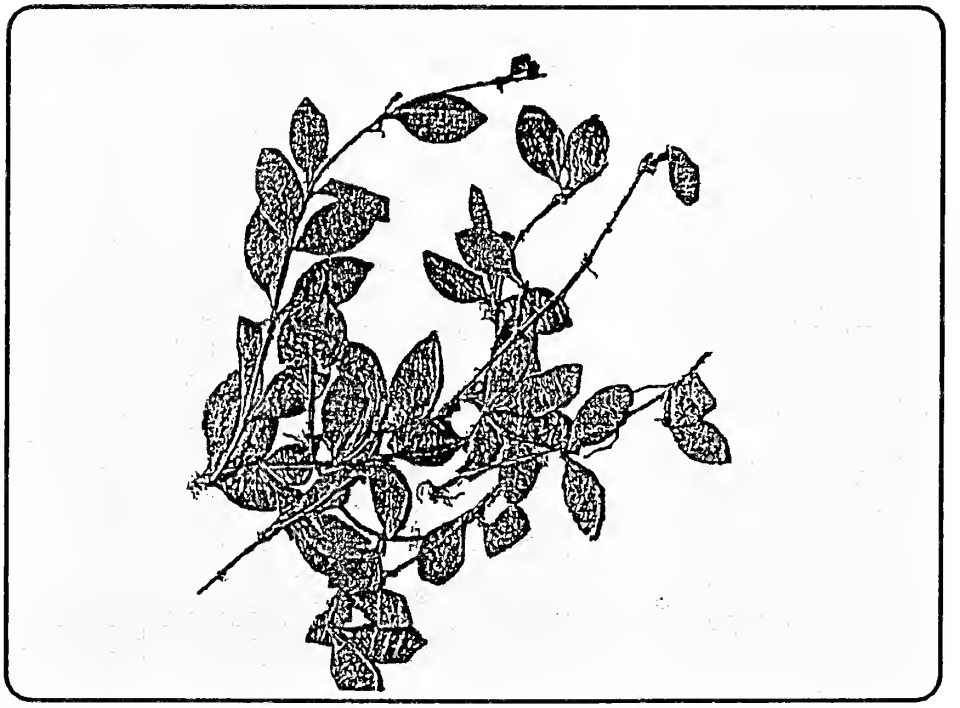
~~Distributed as Hoya~~

MT. BULUSAN
SORSOGON PROV.
LUZON

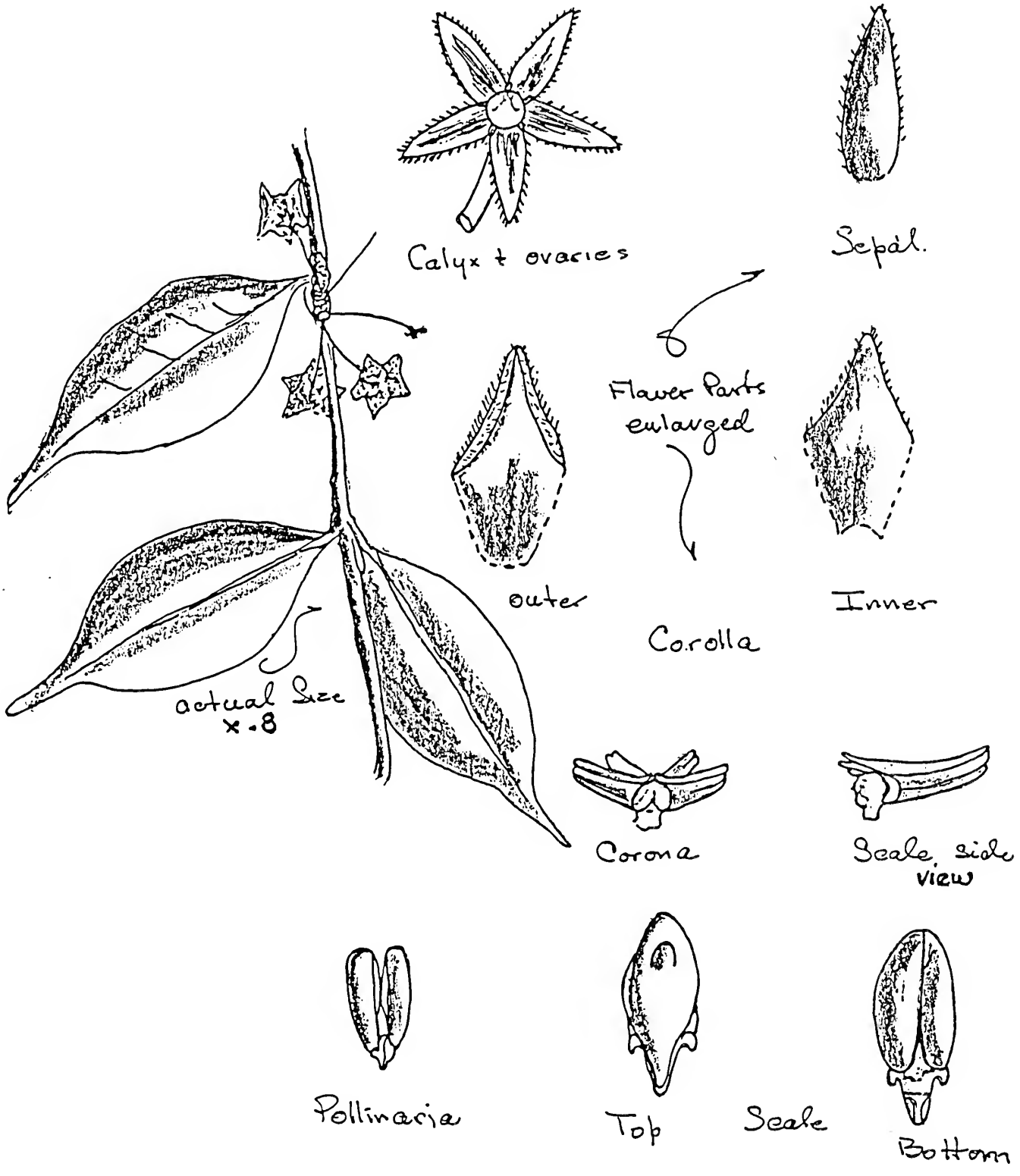
Hoya panchoi Kloppenburg The Hoyan Vol. 10 #1, part II July 1, 1988 p. 1. Syn. H. bulusanensis Elmer in Leafl. Philipp. Bot. 10: 3577 1938. Type: A.D.E. Elmer #15937 on a steep forested ravine at 1500' elevation, Irosin (MT. Bulusan), Sorsogon prov., Luzon, May 1916. Section: Acanthostemma.

Epiphytic, stems and branches slender, glabrous, minutely and numerously punctate, with most nodes enlarged. Leaves very thick, glabrous, with both surfaces minutely punctate, subdeciduous, edges straight and entire; of two distinct types, some round 1.5 cm. in diameter, others obovately oblong 2 cm. wide above the middle and 4 cm. in length, obtusely rounded at the apex, with a broad cuneate base. Petiole very short, thick, curved and expanded toward the base, leaving circular scars after falling. Midrib scarcely evident, lateral nerves not visible. Inflorescence axillary. Pedicles bearing rather rigid and lividus colored flowers. Calyx spreading, lobes glabrous and obtuse to acute, coriaceous 0.15 cm. in length, united at the base. Corolla sparingly ciliate pubescent along the margins, otherwise glabrous, united below the middle, the 5 lobes adnate and descending with the tip inflexed, with acute tips, about 0.5 cm. long, relatively broad across the middle. Corona united to the short column, scale tips strongly inbent, thick and fleshy, outer lobe bifid. Alternating between are erect linear processes. Pistils two, flask shaped. Key # 20

Sulat #3677 1947 ?



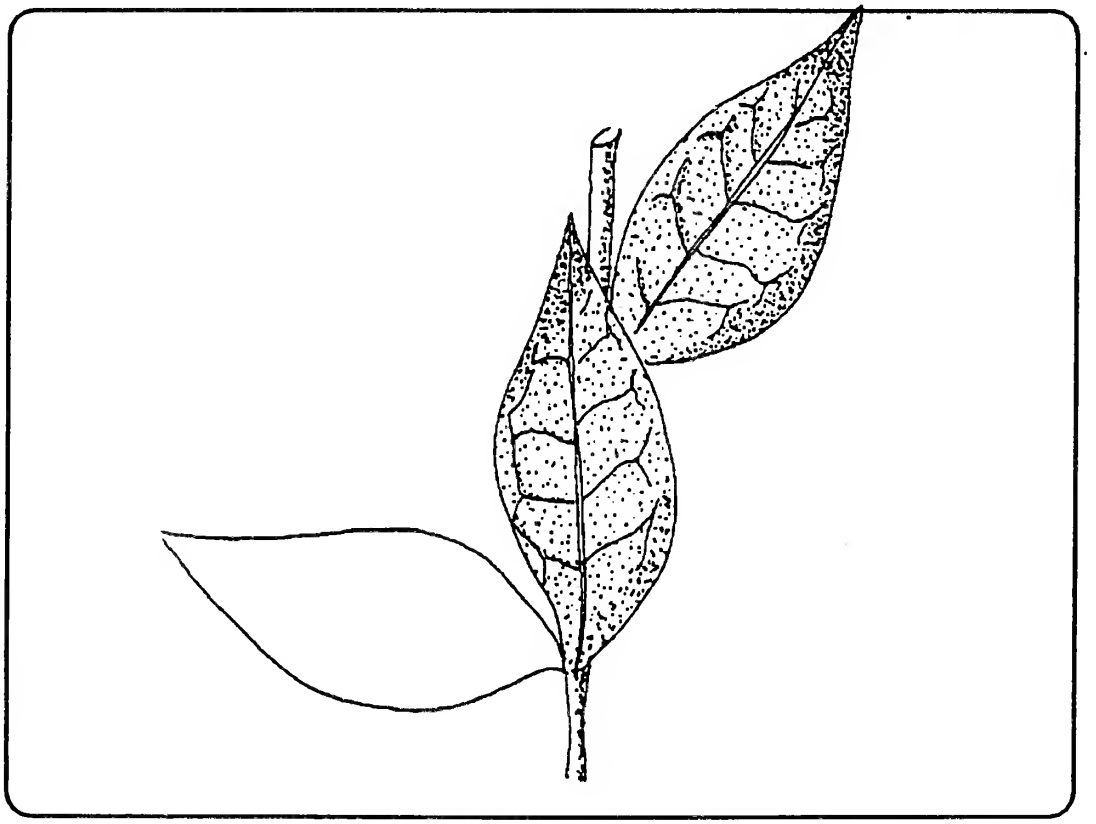
Tracings from Schlechter's H. eugenioides sheet collected by Elmer D. Merrill November 1906 at Halcon Mindoro, Philippines #5618
H. paziae Kloppenburg
By Dale Kloppenburg 1990



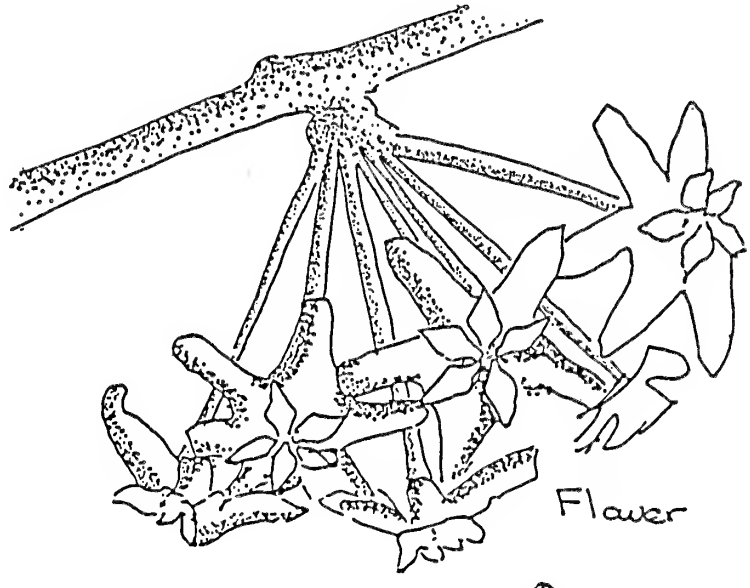
Hoya paziae Kloppenburg in Fraterna Vol. 1, 3rd. quarter 1990. Type #5618 of Elmer D. Merrill (B) found in mossy forest at 900 m. altitude on Mt. Halcon, Mindanao November 1906. (Hoya eugenioides Schlechter unpublished).

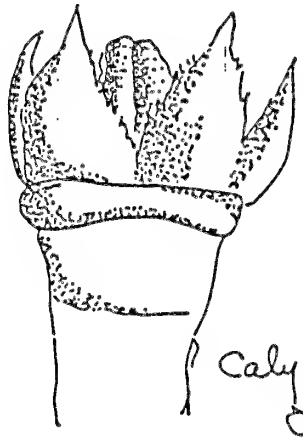
Terete and epiphytic with few branched stems. More like a shrub than a vine. Glabrous, terete with young growth flexible, older more rigid. Well leaved, leaves erect, spreading, shortly petioled, elliptic with rostrate apex, glabrous, thinly coriaceous. Internodes about 4.5 cm. long. Peduncles 3-5 cm. long, terete. Blades fairly uniform most being 6-7 cm. long x 2.5-3 cm. at the widest, a little below the middle. Flowers few in umbels, white with purple crown, odorless. Peduncles very short, axillary or extant. Pedicels filiform, thin, glabrous, about 1.5-2 cm. long. Calyx lobes narrowly elliptic like H. tsangii, outside pubescent with ligules present. Corolla flattened about 1.4-1.6 cm. in diameter, cut up to the middle, outside glabrous, inside pubescent, free edge turned under. Coronal lobes fleshy, horizontal or with outer lobe slightly elevated, outer apex broadly rounded, obtuse with an umbo on top surface near the outer apex. Inner apex drawn out narrowly and shortly ascended. Anthers not exceeding the inner lobe. Scales fully channeled below the full length, sides sculptured with two long longitudinal ridges. Staminal column medium length. Pollinarium with relatively long pollinia, short translators and short and rather broad retinaculum. Key #4

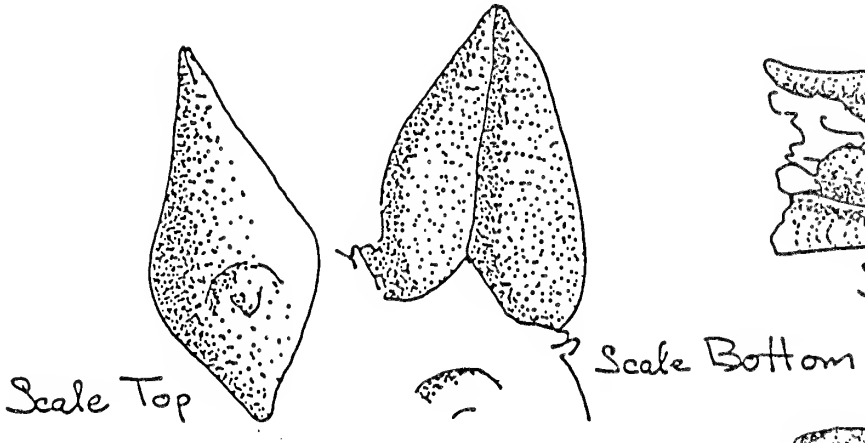
Mcgregor Ascension #32374, Antique Province, Panay, May-August 1918 (BO)

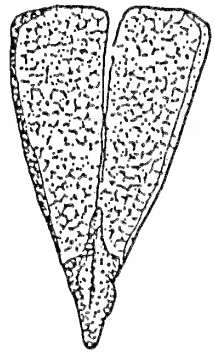


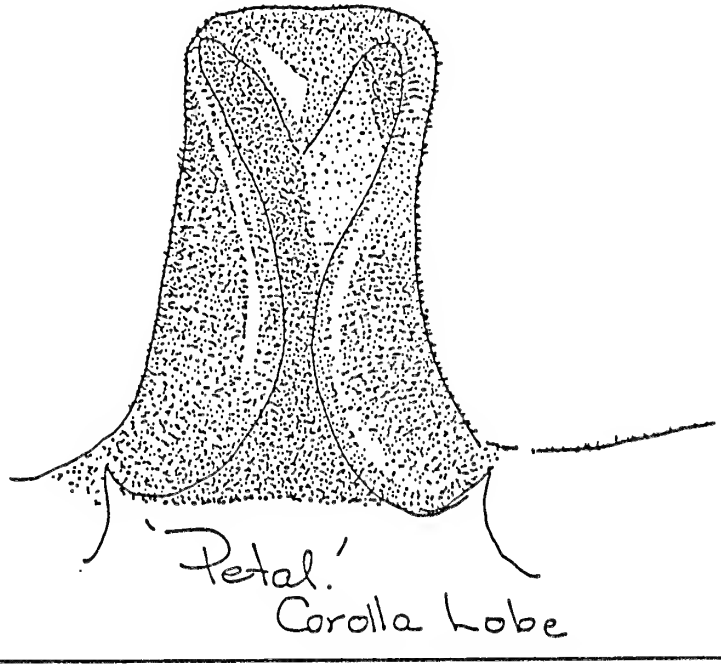
Hoya pentaphlebia Merrill









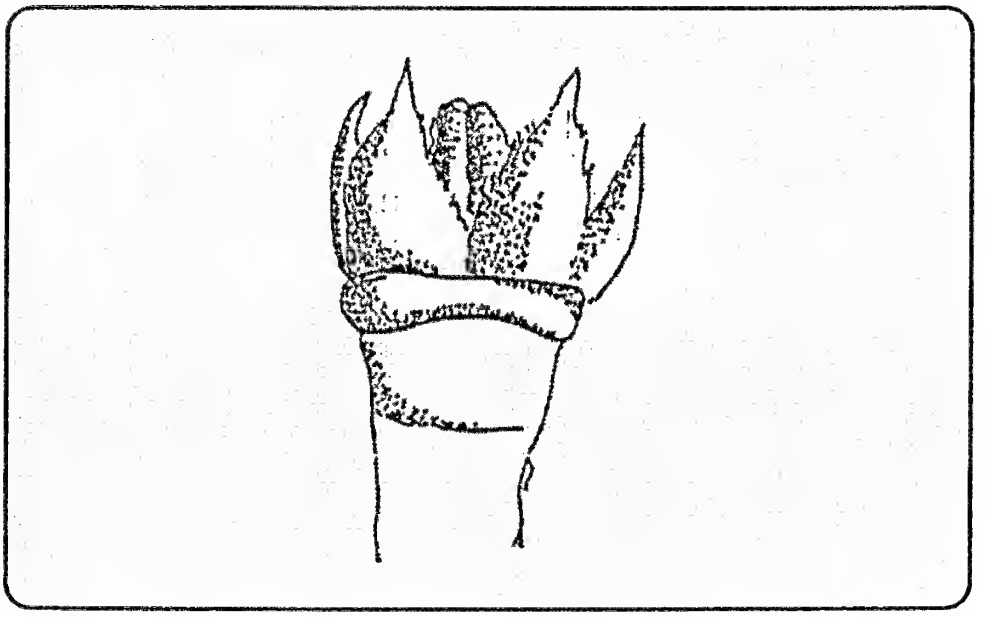


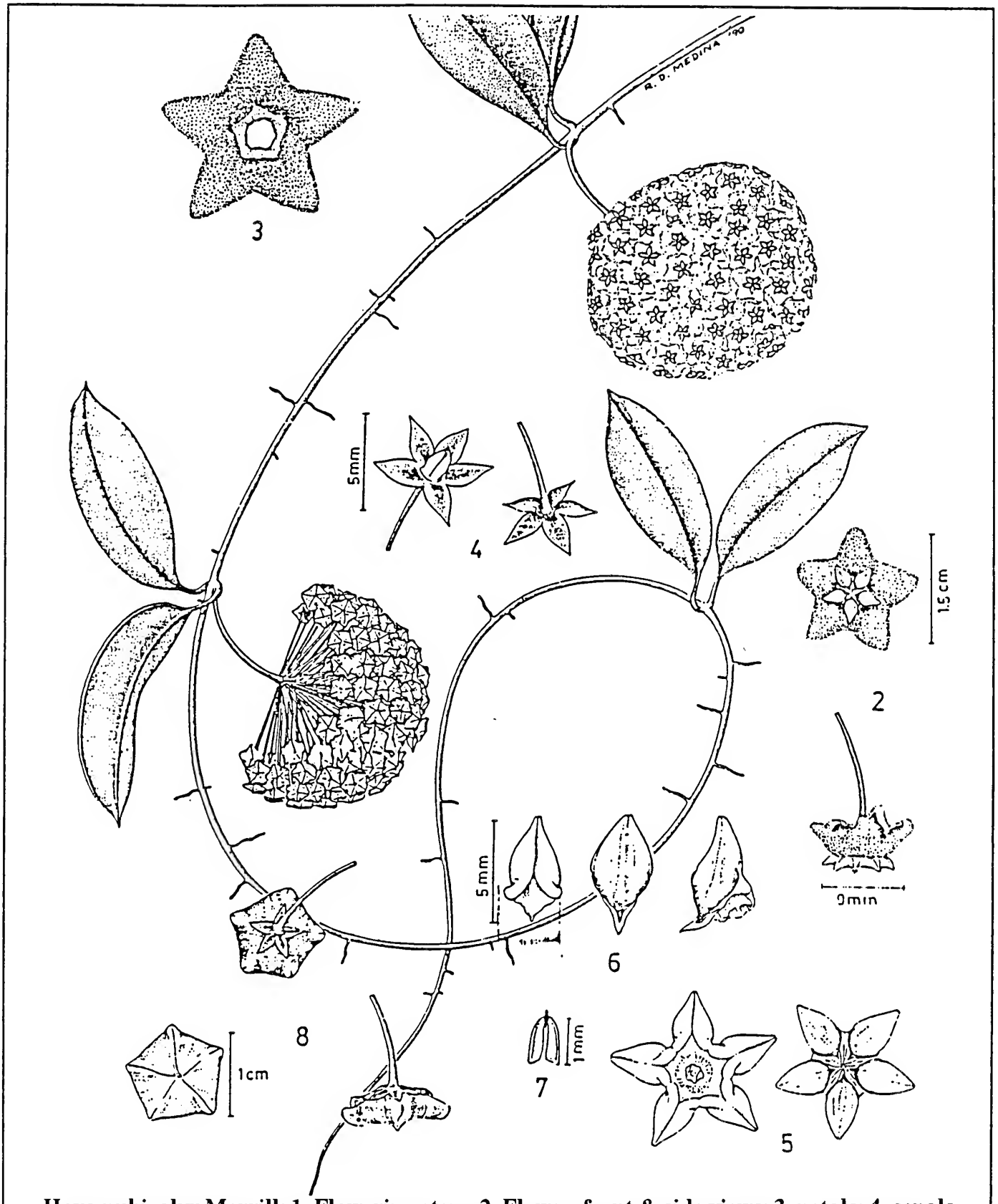
Hoya pentaphlebia Merrill in Philippine Journal of Science Vol. 13, C, (1918) pp.330-1. Type: Ramos # 17411 9 March 1914 (US) in damp forest Cauayan Valley, Samar. Section: Eu-Hoya.

A scandent vine, entirely glabrous except for the inner papillose corolla lobes. Branches terete, smooth up to 0.5 cm. in diameter, rooting, internodes up to 12 cm. long. Leaves thickly coriaceous, broadly ovate to elliptic 8-16 cm. long, 6-9 cm. wide, apex broadly and rather prominently acuminate, base rounded, prominently 5 nerved the interior pair reaching the apex, reticulations lax, distinct on both surfaces, margins recurved, leaf surface undulant. Petioles short 2-5 cm. long. Umbel axillary, solitary or fascicled, many yellow flowers about 4 cm. in diameter. Peduncle 2-5 cm. long, rachis thickened, cylindrical, 0.3-0.4 cm. in diameter, scarred. Sepals membranaceous, oblong ovate, somewhat acuminate 0.15 cm. long. Corolla 0.7-0.8 cm. in diameter, buds prominently 5 angled, 0.4 cm. in diameter, inner surface papillate, rhomboid, somewhat acuminate, 0.4 cm. long and 0.3 cm. wide. Corona 0.4 cm. in diameter, flat to slightly concave above, outer apex not recurved, inner apex elevated, short, acute. Pods about 12 cm. long. Found in Samar, Biliran, Mindanao, (Surigao). Key #8

Enumeration of Philippine flowering Plants Vol. 3 (1923) p.353.

Ramos #17411 1914 (US); McGregor #18831, #43729 1924 (UC,PNH); Ramos and Pas casio #34454; Anonuevo #13703 1950 (PNH); Sulit #6237 1948 (PNH,A); Pancho #3312 1954 (CAHUP); Zwicky #763 1938 (A).





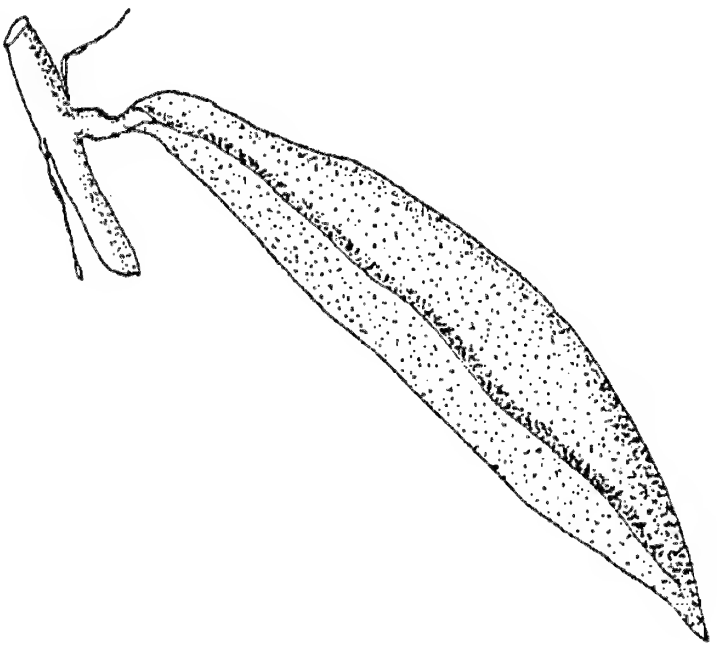
Hoya pubicalyx Merrill: 1. Flowering stem; 2. Flower, front & side views; 3. petals; 4. sepals, front & back views; 5. corona, front & back views; 6. corona scales, 3 views; 7. pollinia; 8. young flower, 3 views.

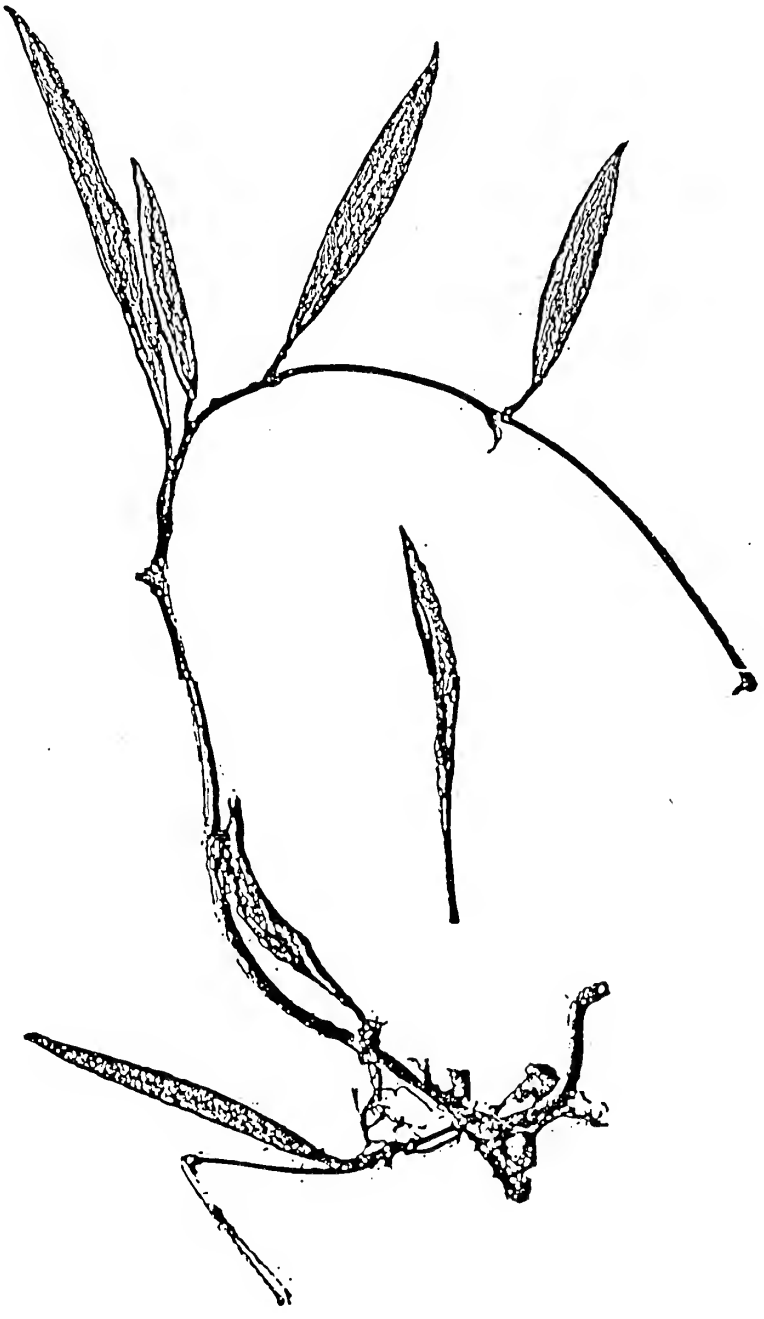
Hoya pubicalyx Merrill in Philippine Journal of Science Vol. 13 C5 (1918) p.131. Type: Ramos & Edano # 19484 at Mauban, Tayabas, Quezon Province, Luzon 24 Jan. 1913 on trees along streams in damp forests. Section: Eu-Hoya.

A scandent shrub, entirely glabrous except for the inflorescense, branches subterete about 9.3 cm. in diameter, internodes up to 20 cm. long. Leaves fleshy, oblong to oblong-ovate 10-14 cm. long, 3-5 cm. wide, base obtuse, apex distinctly acuminate, pinnately nerved, indistinct about 6 on each side of the midrib, ascending, scarcely more evident than the lax indistinct reticulations. Petiole 1 cm. long. Many flowered umbels 8-9 cm. in diameter, rachis thickened 0.4 cm. in diameter. Pedicel spreading, slender, 3.5 cm. long, pubescent. Flowers fragrant 1.8 cm. in diameter, larger than in H. meliflua. Calyx lobes oblong ovate to ovate lanceolate, acute or subacute, externally somewhat pubescent 0.4 cm. long, ligules present and of differing lengths. Corolla lobes broadly triangular 0.6 cm. long and wide, outer surface glabrous, inner surface densely papillose, the acuminate apex somewhat recurved. Corona 1.0-1.2 cm. in diameter, stellate, lobes coriaceous, brown, waxy, oblong-ovate to ovate-lanceolate, acuminate about 0.5 cm. long, external apex slightly retuse, inner lobe ascending, upper surface slightly convex and somewhat keeled in the median portion. Found in Luzon (Tayabas, east coast). Key # 27

Enumeration of Philippine Flowering plants Vol. 3 (1923) p.353.

Edano #3235 1948 (PNH); Kondo & Edano #36884 1948 (PNH), #36790 1957 (PNH); Britton #19486 1953 (PNH); Mendoza #97463 1967 (PNH); Fox #9226 1949 (PNH); ? #13972 1951 (PNH); Velasco #9135 1954 (CAHUP), #9136 1954 (CAHUP); Kienholtz #15460 1924 (UC).





16340 PHILIPPINE ISLANDS PLANTS
DISTRIBUTED BY C. B/E. ELMER

Hoya angustifolia Bl.

ISLAND OF LUZON, AUGUST, 1915

H. tsangii (Syntypt)

Hoya tsangii Burton in The Hoyan Vol. 9 #4 (1988) pt.2 pp.i-ii. Type: Elmer #13372 * from Calabaran (Mt. Urdaneta) Agusan Prov., Mindanao Aug. 1912. Syn. H. angustifolia Elmer in Leaflets of Philippine Botany Vol. 10 (1938) p. 3572, nom. invalid. Type: Elmer # 16340, #16916 discovered on Mt.Bulusan, Irosin, Sorsogon prov. Luzon at 1000 feet altitude in dense woody tangles. Section: Acanthostemma

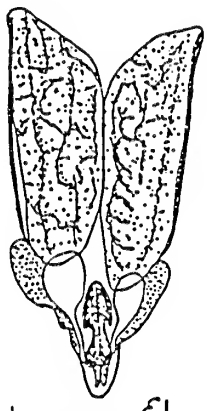
Epiphytic, with terete, smooth, glabrous, long branched stems, tough , wiry, woody near the base up to 0.3 cm. in diameter, young branches flexible, rooting at the nodes, intertwined branches forming tangles. Leaves widely scattered especially along the branches, very thick, descending or pendant, especially rigid , deciduous, narrowly lanceolate, equally tapering from the widest portion (middle) toward both ends, apex sharply acute, entire margin revolute, 8-12 cm. long, but many 5 cm. long and 1-1.5 cm. wide, both surfaces papillate, midrib scarcely visible, lateral nerves obsolete. Petiole 1 cm. long, extending into the narrowly cuneate base, channeled along one side. Peduncles axillary from enlarged nodes, terete, glabrous, 3-5 cm. long, green, ascending, rachis very thick, rounded 1 cm. long. Pedicles extremely curved, pale green, filiform, 1-2 cm. long, diverticulate, spreading and curved, deciduous. Umbel geotropic concave to flat. Flowers rigid 0.8 - 0.9 cm. diameter. Corolla united below the middle, lobes oblong ovate 0.2 -0.35 cm. long, reflexed, apex acute, outside glabrous, inside grayish pubescent. Corona lobes small, ascending, inner lobe extended subacute, outer obtuse with side structures forming bilobed extensions, lobes 0.2 cm. long. Anther append ages exceeding inner lobe of corona. Stigma conical tapered, erect, angular with blunt tip covered with pubescence. Pollinia translators winged. Fruit linear, subterete, curved, smooth, 8 - 14 cm. long, apex pointed. Seeds brown , flat, linear 0.6 cm. long pointed at base, truncate at apex with dingy white coma.

* A.D.E. Elmer's type specimens #16340 and #16916 was discovered in dense woody tangles on a huge Diplocarpus warbargii Brand tree at 1000' altitude, Irosin (Mt. Bulusan, Sorsogon Province, Luzon, Aug. 1916. Elmer stated in Leafletts of Philippine Botany Vol. 10 (1938) p.3572 that sheet #13372 from Calabaran (the designated type sheet for H. tsangii Burton) was not typical.

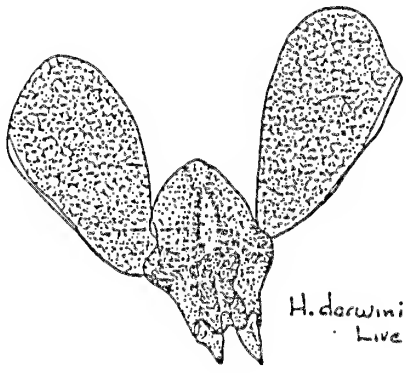
This plant is usually associated with Hoya bordenii Schlechter in the jungles bordering lagoons.

Britton #19647 1953 (PNH); Guterrez & Edano #37800 1957 (PNH); Salvoza #3699 1946 (PNH); Edano #333 (PNH);? Mendoza #98623 1968 (PNH); Loher #13289 1915 (UC), #12986 1915 (UC); Elmer #16919 (A) 16340 (A) #16916 1916 (UC), #13372 1912 (UC) (CAS).

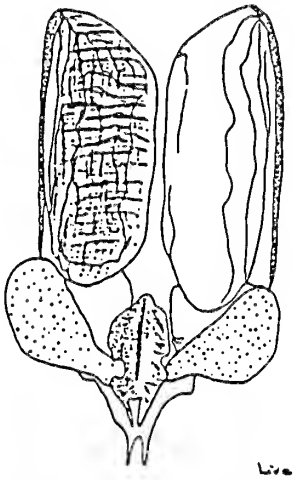
A comparison of pollinia in the Hoya genus



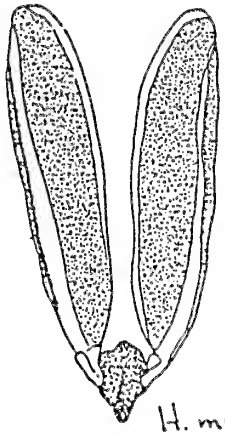
H. obscura Elmer ex Burton
live material



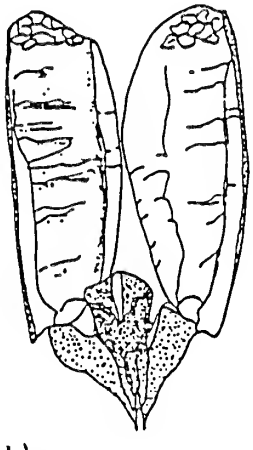
H. darwinii
Live material



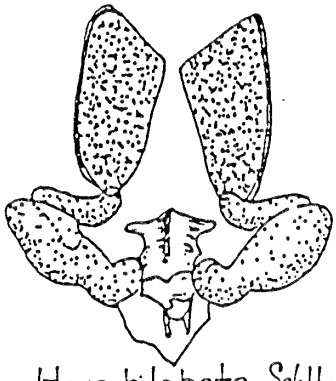
Live material
H. burtoniae
Kloppenburg



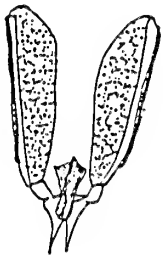
H. multiflora
green leaf
Live material



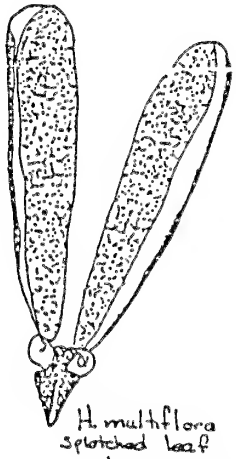
H. quinquinervia



Hoya bilobata Schltr.
Live material

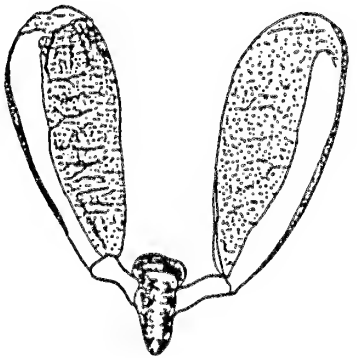


Hoya benquetensis, Schlt
Live material

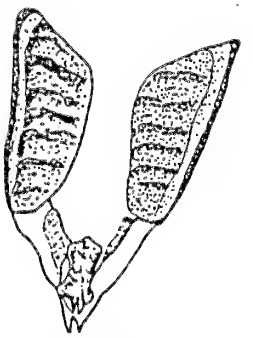


H. multiflora
splotched leaf
Live material.

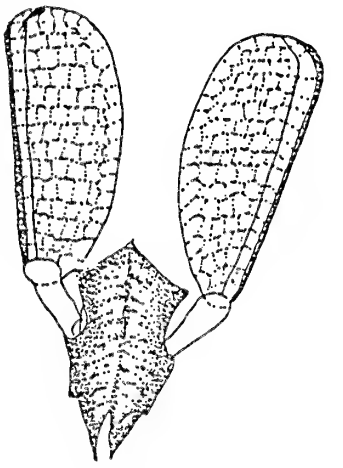
Pollinia comparison, continued



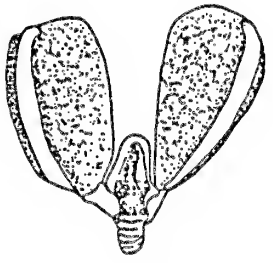
H. odorata Schltr.
#13176 A. Loher Col. 1913



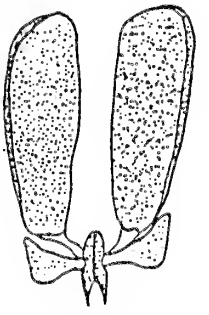
H. cagayanensis Burton



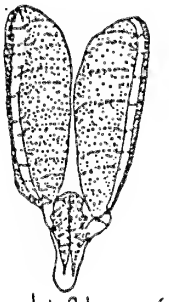
H. cumingiana Decne
live material



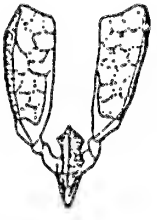
H. bordenii Schltr.



Hoya imbricata
Calley & Decar.

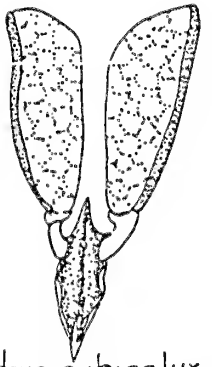


H. meliflua (Blco.) Merrill
live material

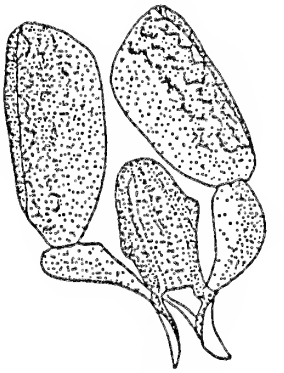


.075 mm long
retinocula 1/3 length

Hoya incrassata, Warb.
Live material

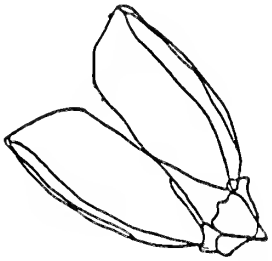


Hoya pubicalyx, Merrill
Live material

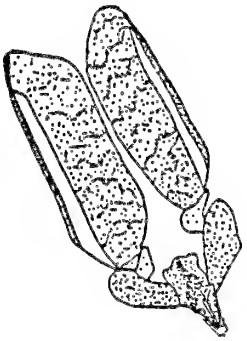


H. heuschkeliana
Live Material
Type

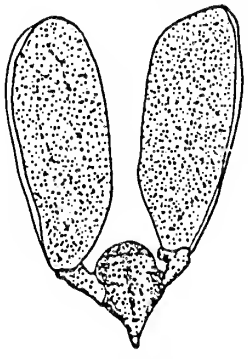
Pollinia comparison, continued



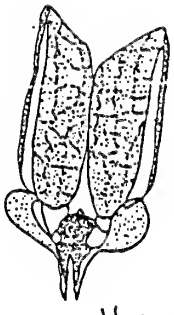
H. camphorifolia
Live material



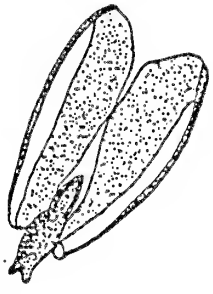
H. tsangii
Live material



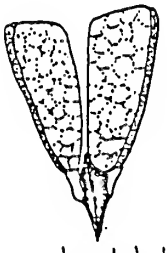
H. crassicaulis
Type Sheet



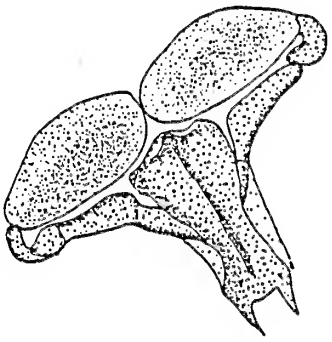
H. gracilis
Live material



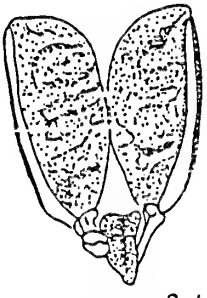
H. paziae
Herbarium Sheet



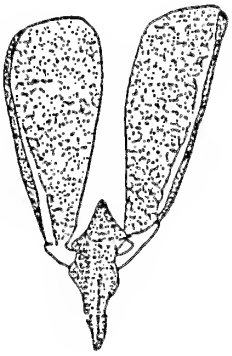
H. pentaphlebia
Merrill
Live material



H. madulidii
Type Sheet.

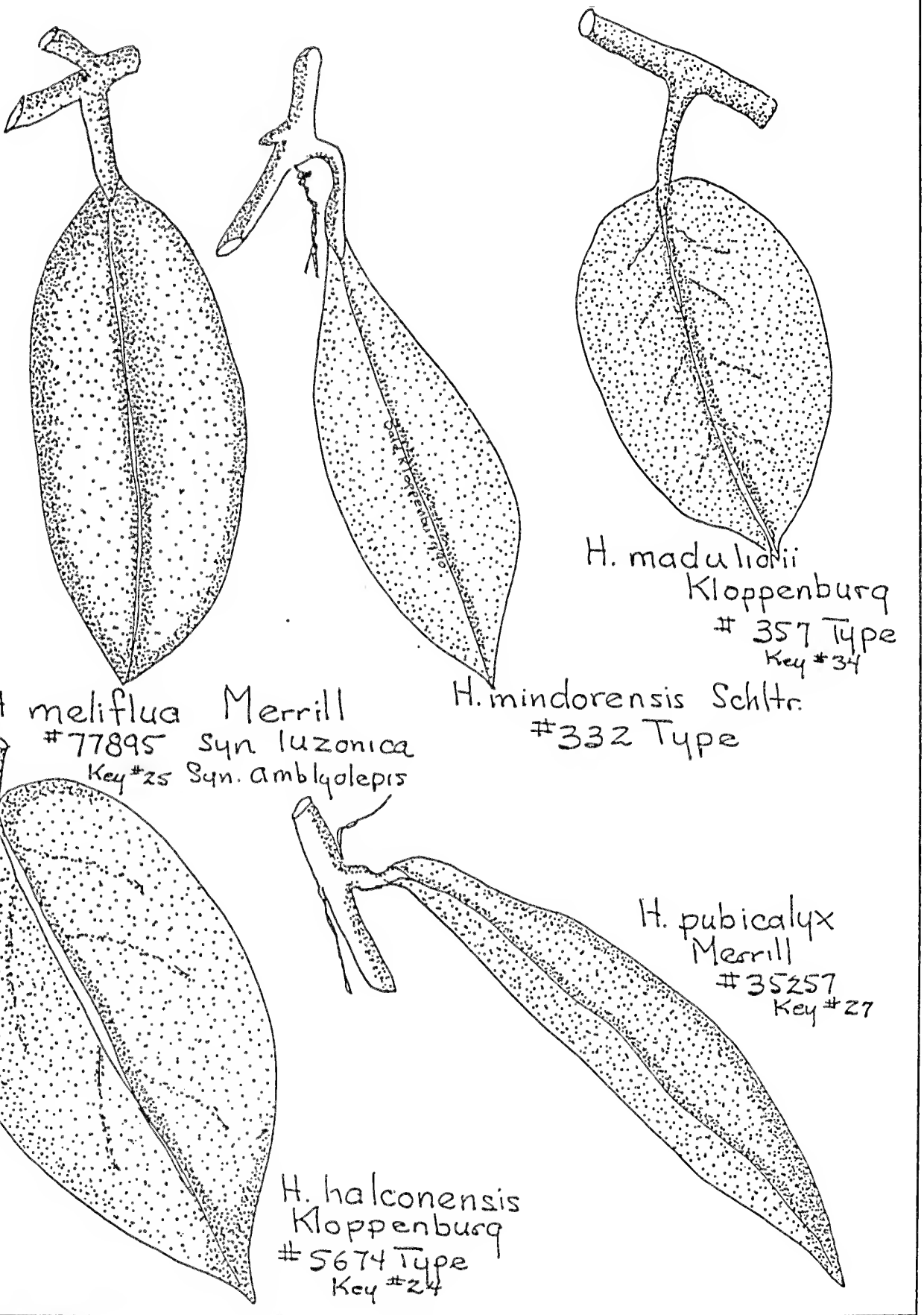


H. camphorifolia Warb.
Live material

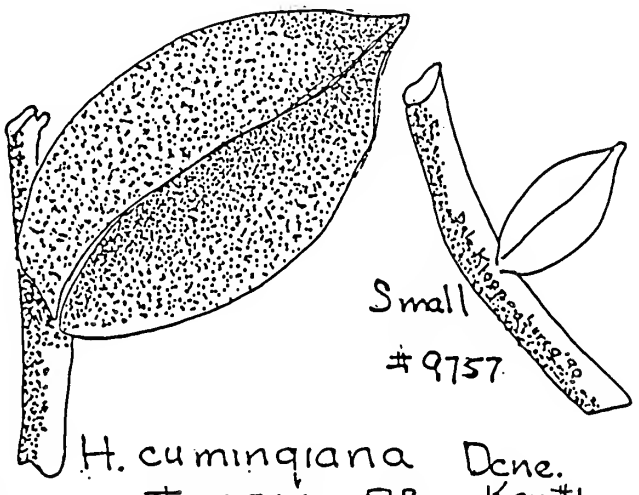


H. pentaphlebia
live material

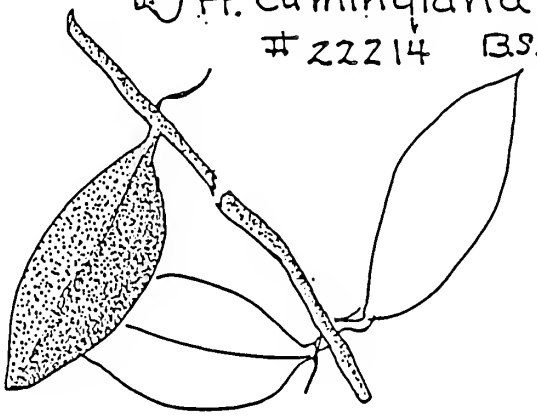
A comparison of leaf venation in the Hoya genus
Large Enervis



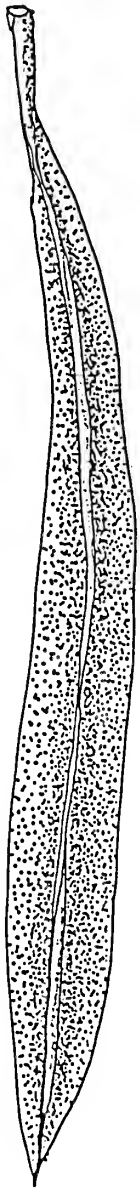
A comparison of leaf venation in the Hoya genus
Small to Medium Enervis



H. cuminqiana Dcne.
#22214 BS. Key #1

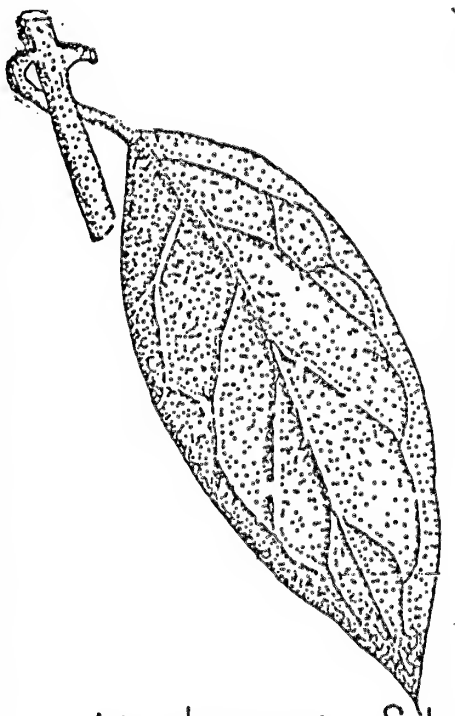


H. burtoniae Kloppenburq
Type: without #
Key # 18

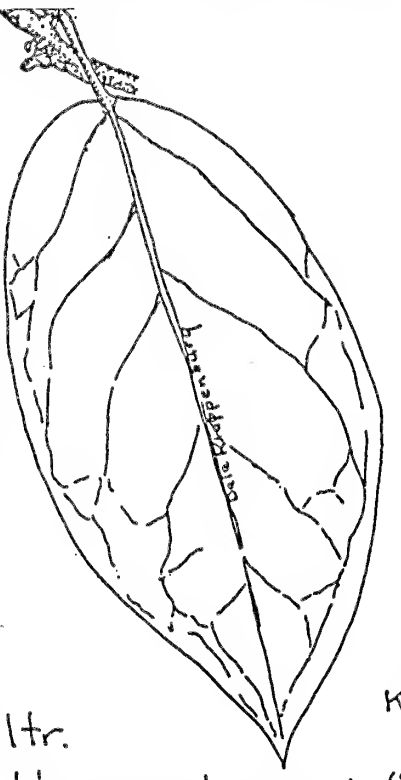


H. pubifera Elmer
#16971 Type
Not in Key

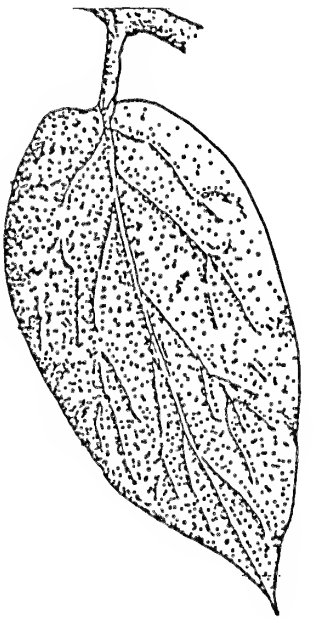
A comparison of leaf venation in the Hoya genus
Medium to Large Pinnate



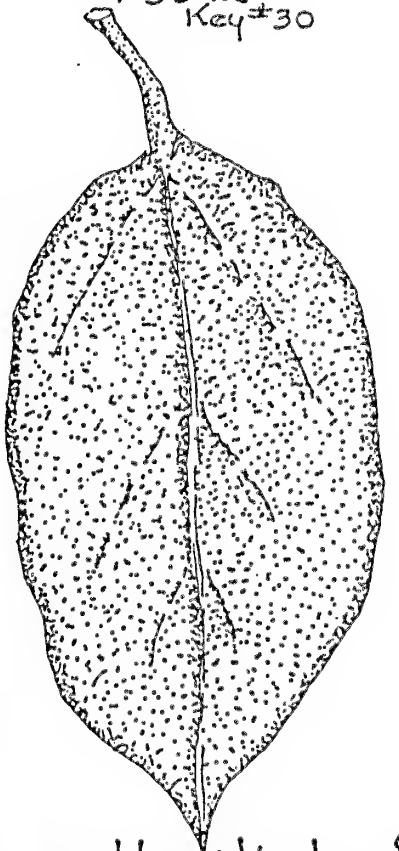
H. alagensis, Schltr.
#5542
Key #30



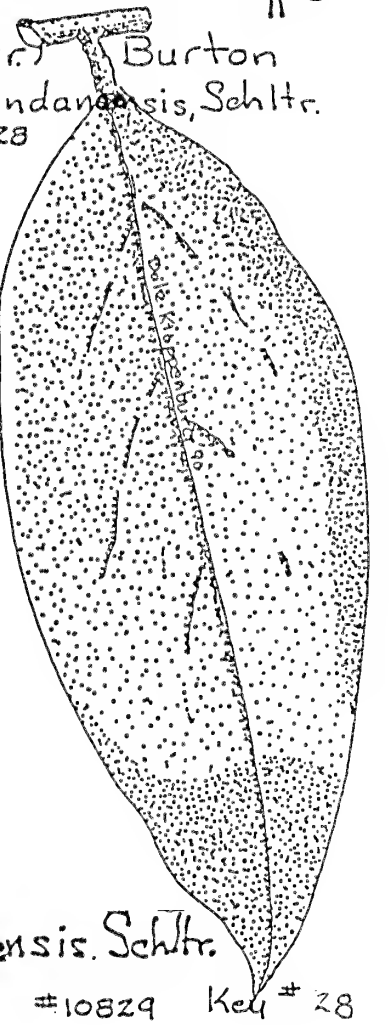
H. angustisepala (Schltr.) Burton
#43947 syn. mindanaensis, Schltr.
Key #28



H. cardiophylla, Merr.
Key #32 #35160 Type

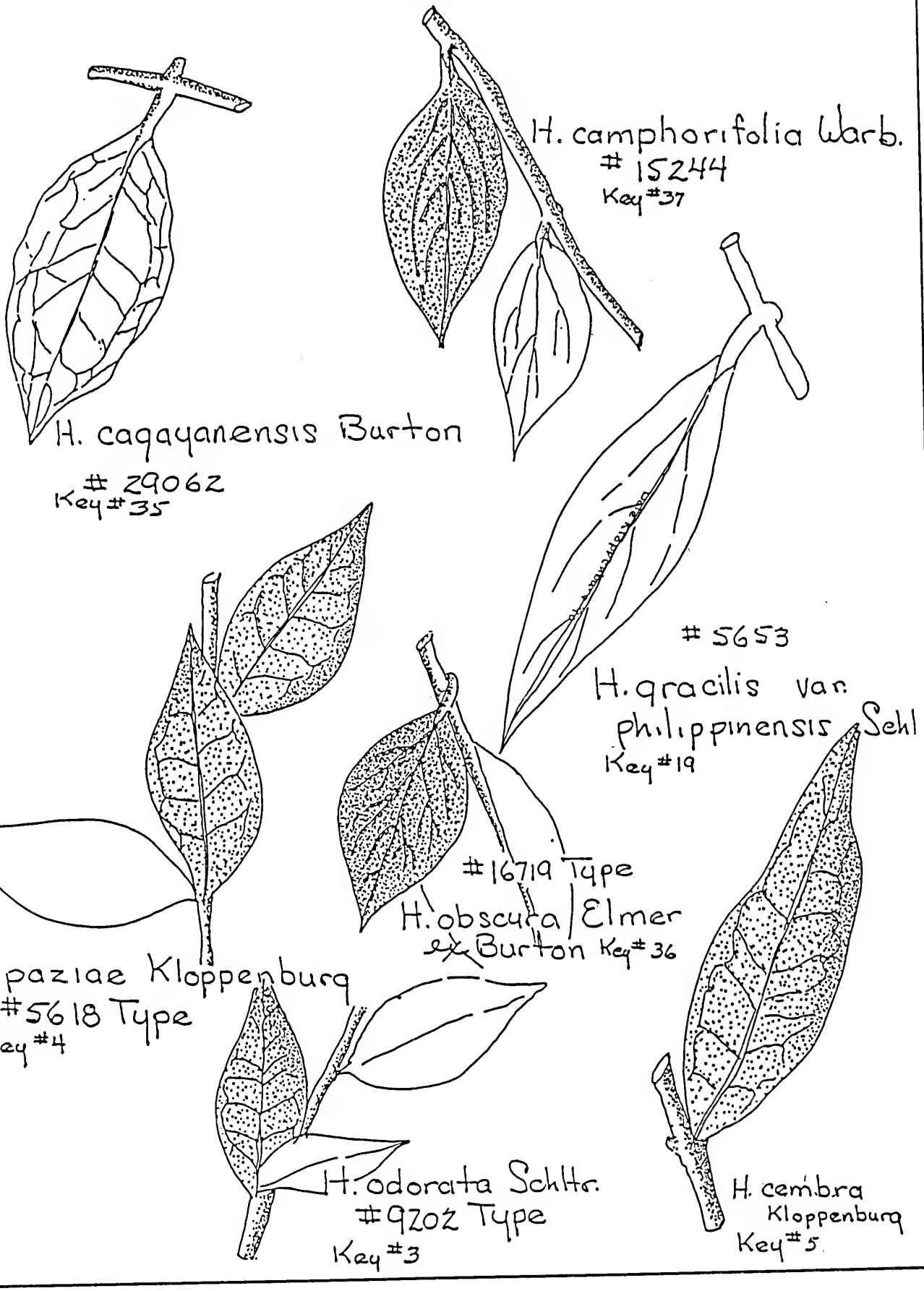


H. ciliata, Elmer
#11072 Type
Key #33

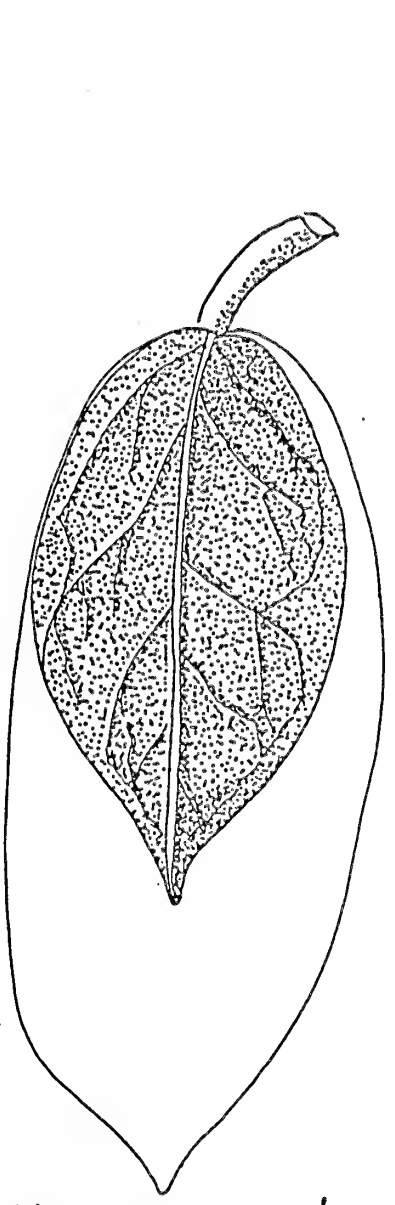


H mindanaensis. Schltr.
Type #10829 Key #28

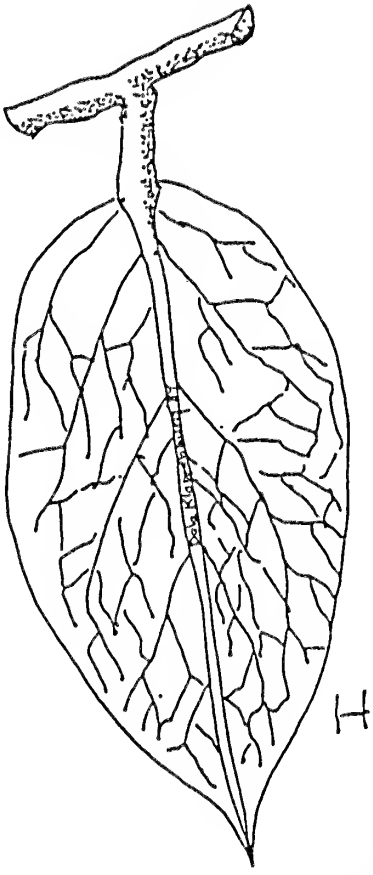
A comparison of leaf venation in the Hoya genus
Small - Not Palmate



A comparison of leaf venation in the Hoya genus
Pinnate & Reticulate

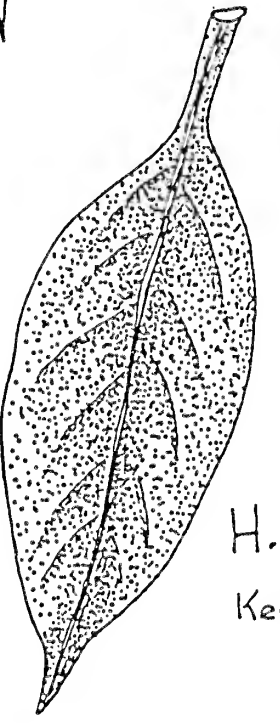


H. incrassata, Warburg
12997-8 Type
Key # 31



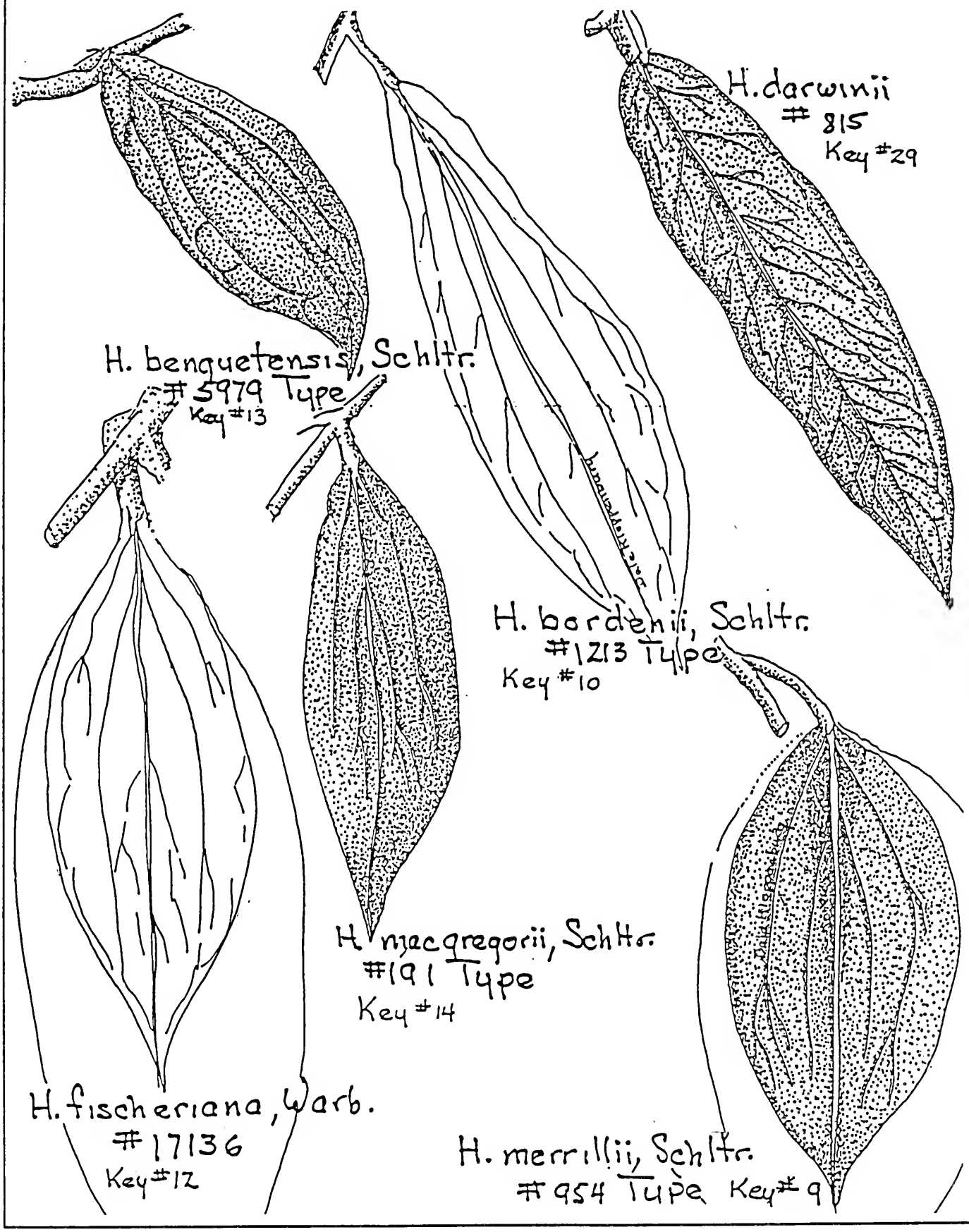
H. reticulata, Merr.
83385
Not in key

H. palawanica
Key # 11

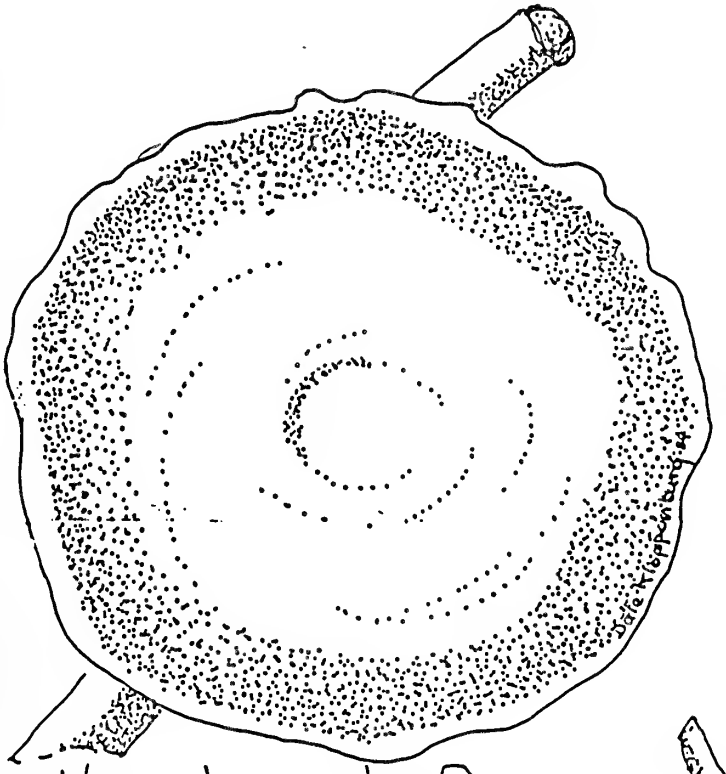


H. multiflora
Key # 2

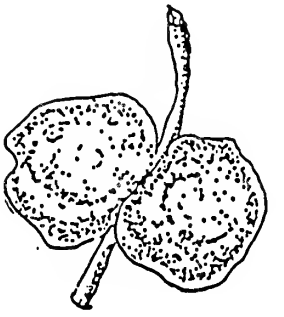
A comparison of leaf venation in the Hoya genus
Basal Nerved & Reticulate



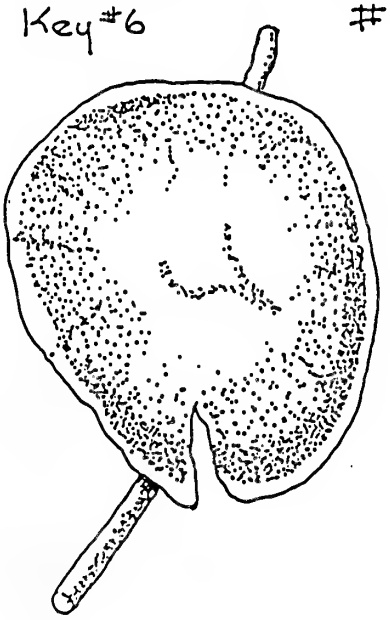
A comparison of leaf venation in the Hoya genus
Orbicular



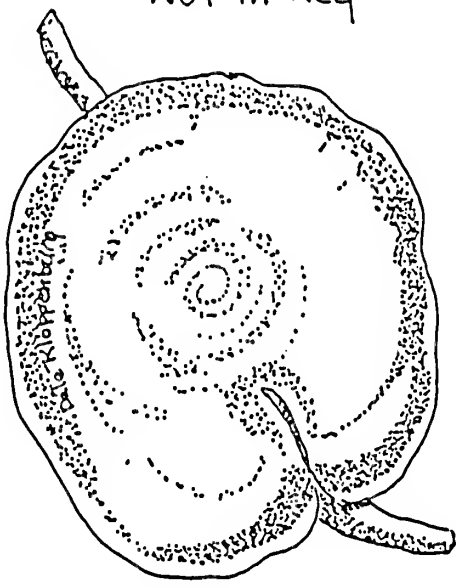
H. imbricata, Decaisne
Key #6 # 2363



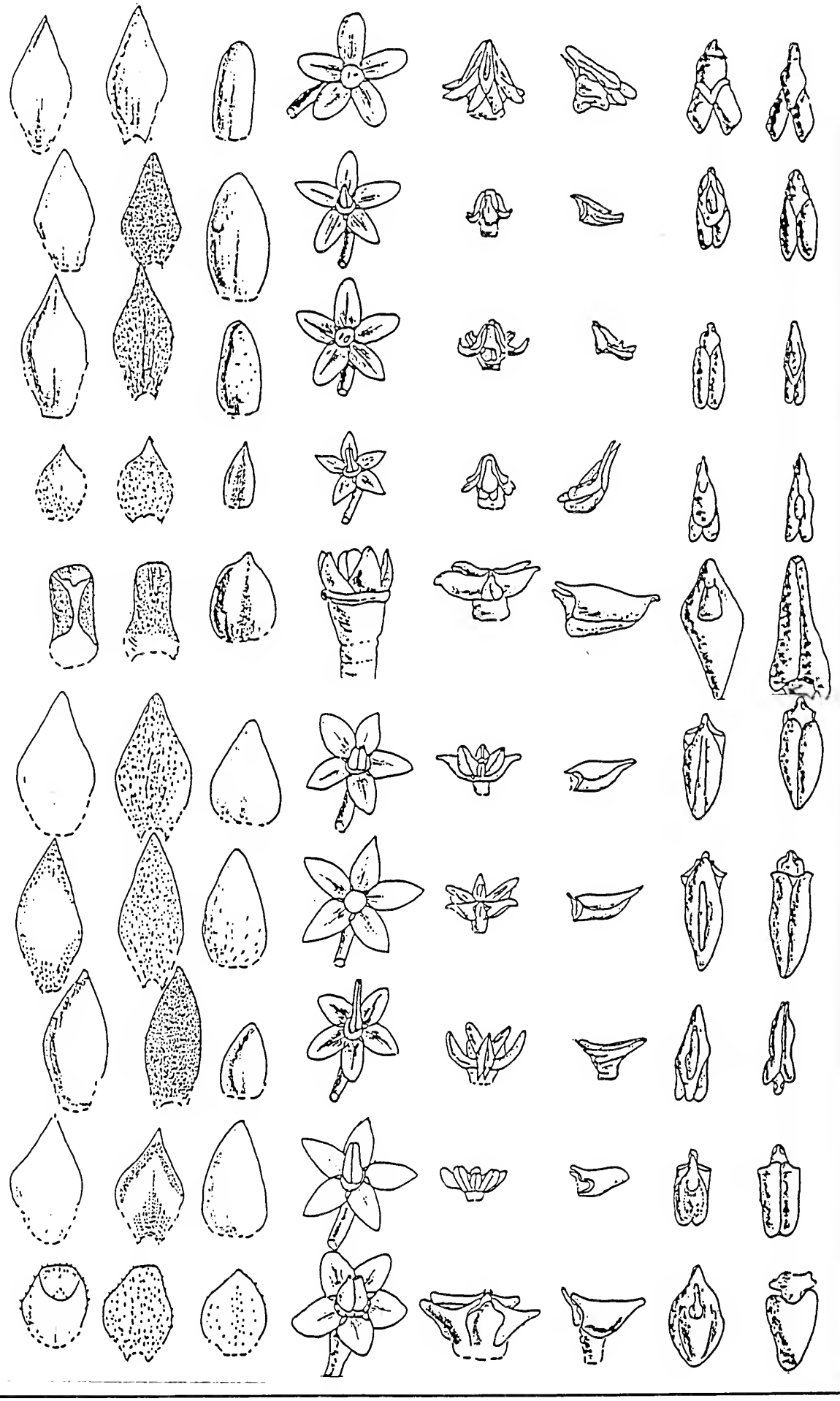
H. shallertiae, Burton
US Herb #447593
Not in Key

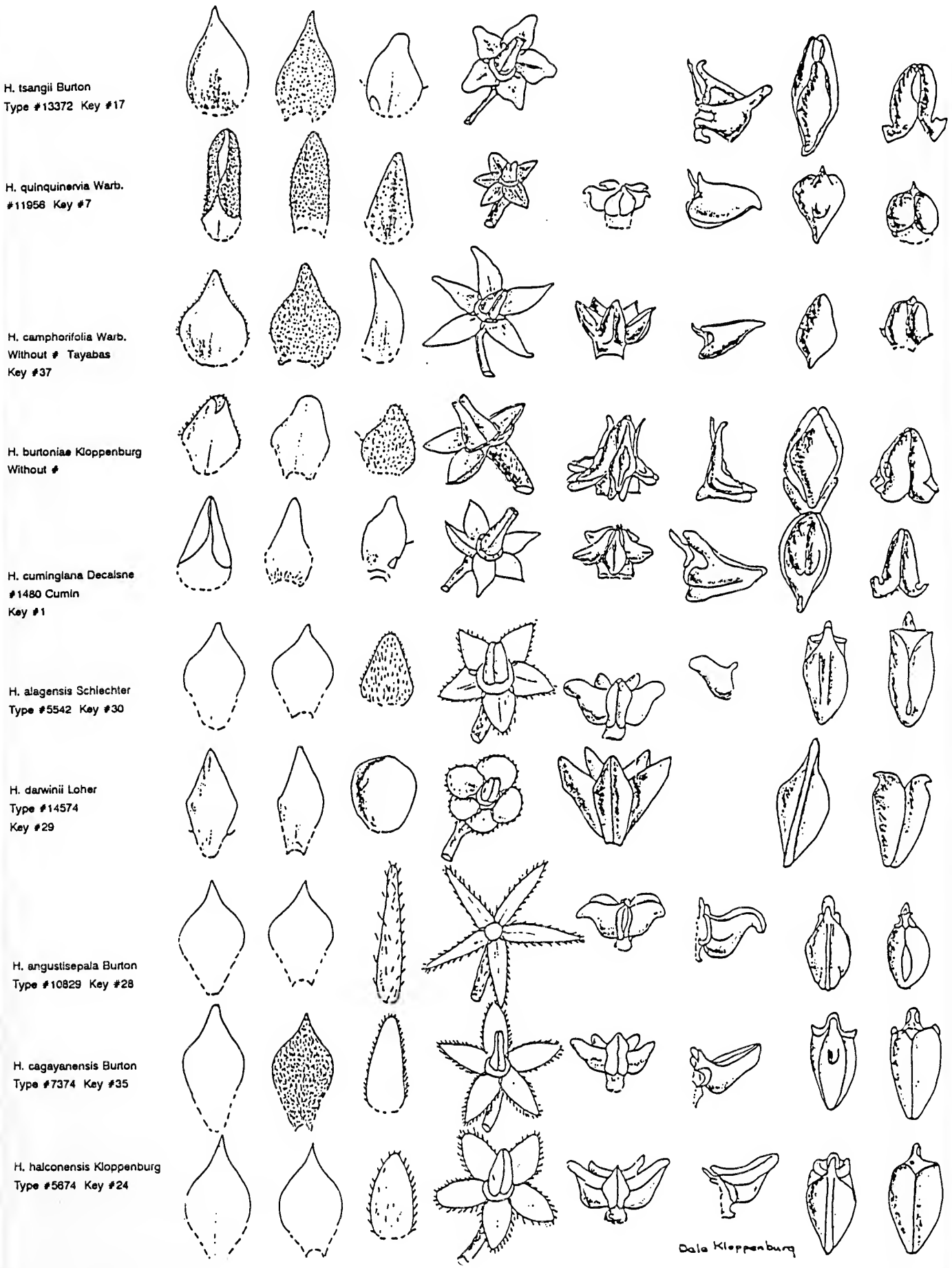


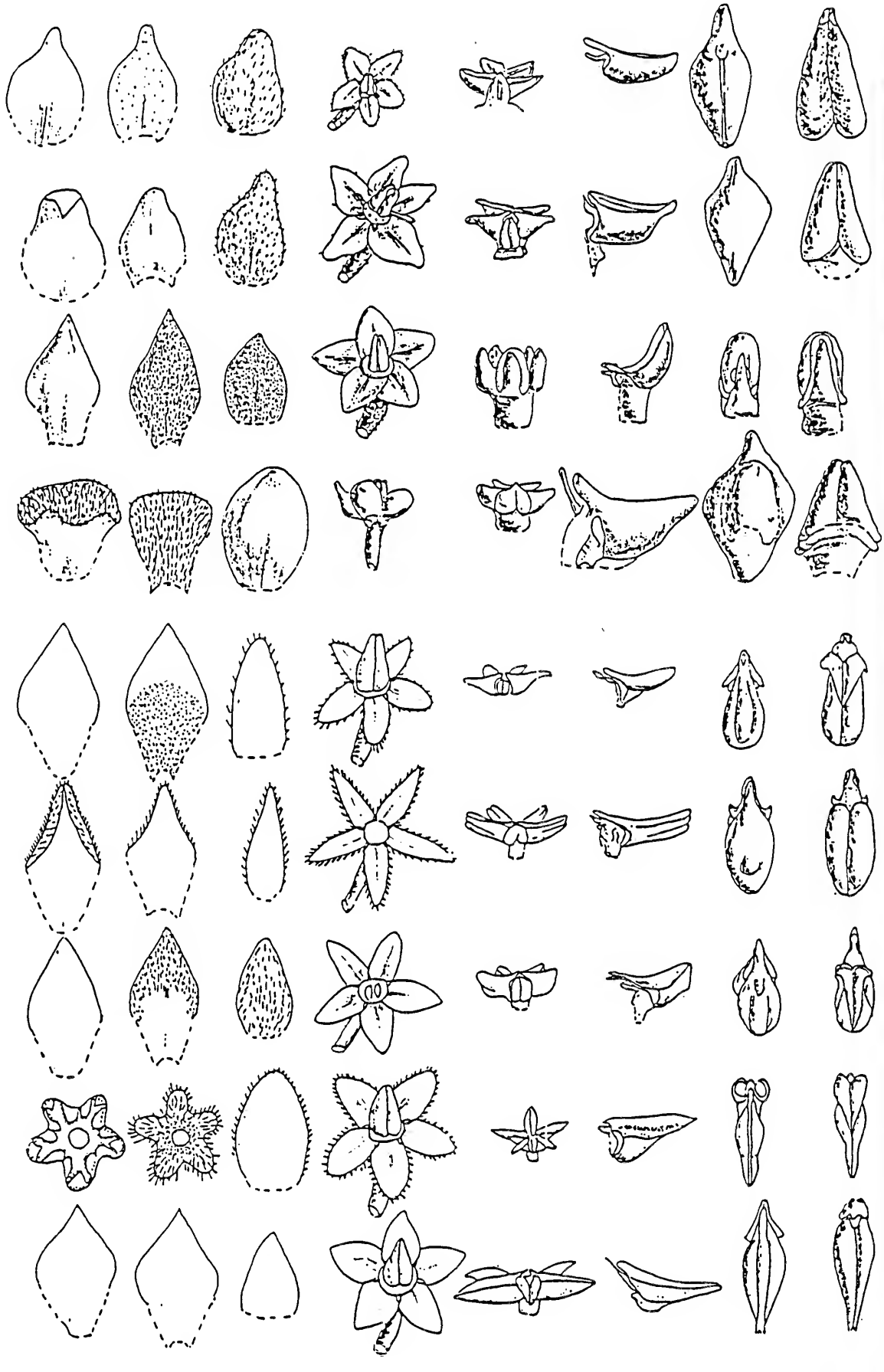
H. imbricata var basi-cordata
Koorders #24910
Not in Key



H. pseudo-maxima, Koord
22089
Not in Key


H. intermedia Schlechter
Type #5177 unpublished
not in key
H. bilobata Schlechter
Type #420 Key #22
H. gracilis Schlechter
Type Key #19
H. heuschkeliana Kloppenburg
Type #2175 Key #16
H. pentaphlebia Merrill
Type #17441 Ramos
Key #8
H. benguetensis Schlechter
Type #5979 Key #13
H. bordenii Schlechter
Type #1213 Key #10
H. merrillii Schlechter
Type #2218
Key #9
H. mcgregorii Schlechter
Type #191 Key #14
H. obscura Elmer ex Burton
Type #16719 Key #36


H. tsangii Burton
Type #13372 Key #17
H. quinquinervia Warb.
#11956 Key #7
H. camphorifolia Warb.
Without # Tayabas
Key #37
H. burtoniae Kloppenburg
Without #
H. cuminglana Decaisne
#1480 Cumin
Key #1
H. alagensis Schlechter
Type #5542 Key #30
H. darwinii Loher
Type #14574
Key #29
H. angustisepala Burton
Type #10829 Key #28
H. cagayanensis Burton
Type #7374 Key #35
H. halconensis Kloppenburg
Type #5674 Key #24
Dale Kloppenburg


H. incrassata Warb.
Type #12998
Key #31 live material
H. pubicalxy Merrill
Type #19484
Key #27 live material
H. madulidil Kloppenburg
Type #357
Key #34
H. meliflua (Blco.) Merrill
Key #25 live material
H. odorata Schlechter
Type #3202
Key #3
H. pazlae Kloppenburg
Type #5618 Key #4
H. cembra Kloppenburg
Type #5650 Key #5
H. mindorensis Schlechter
Type # 332
H. palawanica Kloppenburg
Type #834 Key #11

Hoya ciliata Elmer ex Burton in The Hoyan Vol. 9 #4 part 2 p. i. 1988. Hoya ciliata Elmer in Leaflets of Philippine Botany Vol. 10 (1938) p. 3577. Syn. Hoya rotundisepala Elmer loc. cit. (1938) p. 3579, in. obs., pre. Syn. Hoya philippinensis P. T. Li in Bull. Bot. Res. North-East Forest Inst. Vol. 4 (1) (1984) p. 120, Nom. inval. Type: Elmer #11072 (BO,UC, A), along a dry wooded ridge of the Baracatan Creek at 1500' altitude, Tadayo (Mt. Apo) Davao, Mindanao, July 1909. Section: Eriostemma

A suffructescent climbing vine on small trees and shrubs. Stems 0.4- 1.5 cm. in diameter mostly green, terete, pubescent and sparingly branched. Petioles arise from expanded nodes, minutely pubescent 2 - 2.5 cm. long curved ventrally. Blade divarticately hanging, scattered along ultimate branches, rigid and very thick, shallowly concave on the lower surface pale yellowish green, finely and densely ciliate, edges involute, upper surface deeper green, waxy, finely and sparsely ciliate, channeled, veins barely visible, costa visible, straight and prominent on lower surface; 5-7 veins visible on either side almost perpendicular, branching before reaching edge, anastomosing, base broadly rounded to subcordate, elliptic or ovate obtuse toward the mucronate apex, larger blades 12 cm. long, 6 cm. wide, many considerably smaller, deciduous leaving irregular shaped scars. Peduncles curved, suberect from the lower side of the node also green like the stem and peduncle, densely ciliate 5 cm. long. Pedicels averaging 3 cm. long, sparsely ciliate straight or curved. Sepals 0.5 - 0.8 cm. broadly orbicular, basal central part coriaceous, margins subhyaline and minutely ciliate, ventral side glabrous. Umbel rigid, negative geotropic, flowers spread, buds green. Corolla, leathery nearly black when dry, acute apex inflexed, segments recurved, free edges rolled 1 cm. long united below the middle, apex sharp and very acute (both sides glabrous), column very short and thick, subtended by minute scales. Corona outer lobe higher than inner lobe, concave, lobes short oblong, rhomboid at the apex. Key # 33

Sulit # 11766 1953 (PNH), Loher # 12139 1908 (UC), Frake #38261 (A), Kienholtz # 15518 1923 (UC), Edano # 77507 1929 (PNH).

Hoya pulgarensis Elmer Leaflets of Philippine Botany Vol. 10, 1938 p. 3589. Type #12985 A.D.E. Elmer at sea level, Puerto Princesa (Mt. Pulgar), Palawan, April 1911. Section: Eriostemma

Elmer's English description: "A creeping or twining epiphyte, in woods and along shrubberies. Stems curved, occasionally twining, round but in the dry state coarsely rigid or wrinkled longitudinally, 5 mm thick on the yellowish green specimens, sparingly branched, the terminal branchlets considerably thinner, densely soft pubescent throughout, yellowish brown when cured. Leaves deciduous, scattered, opposite, mostly descending, thick and leathery, elliptic, base rounded but not cordate, apex also rounded but terminating into a short apiculate point, margins entire and strongly involutely pressed, soft and densely pubescent beneath, glabrate or only strigose on the upper side, curing yellowish beneath and brownish above, my larger blades 5 to 9 cm. but most of them smaller, widest across the

middle, the upper surface much wrinkled, obscurely so on the lower face; midrib thick, pronounced beneath, depressed above, similarly pubescent and alike in color; lateral nerves 5 to 7 on each side, obscure, divaricate, straight, in the dry leaves more evident from the upper side; reticulations not evident or obsolete; petioles very thick, 1 to 1.5 cm. long, sunken along the upper side, ridged lengthwise, covered with the same yellowish brown pubescence, leaving large, more or less circular scars after falling. Inflorescence upon rather short axillary peduncles which are also rugose and hairy: pedicles of the flowers 1.5 cm. long, severely clustered, light tawny tomentose, erect or ascending, subtended by short densely tomentose bracteoles, relatively slender and somewhat enlarged toward the distal end; calyx united at the base, 5-segmented, the lobes overlapping and broadly ovate, 0.4 cm long and a little broader toward the base, concave on the upper glabrate side, on the outside short but densely pubescent throughout, apex broadly obtuse; corolla with 5 lobes, adnate, 0.75 cm. in length, ovate but with acute apex which is inflexed and thickened along the midvein region on the upper glabrate side, the dorsal side of the lobes minutely pubescent; column very short and very thick, at the base apparently surrounded by a fleshy rim with finely ciliate edges; the crown of 5 horny prongs erect, strongly rigid, erect and enclosing the pistal, broadly elliptic in shape; anthers small, upon uniform fleshy membranes covering the stigma". Key # 23

Hoya quinquenervia Warburg in Perkins, Fragmentia Florae Philippinae Vol. 1 (1904) p.132. Type: Warburg #11956 at Malunu, Isabela Prov., Luzon.

An epiphytic vine with coriaceous foliage, standing out, broadly ovate 6.5 cm. long by 4 cm. wide, apex shortly acuminate acute, base rounded, 5 nerved, the innermost about reaching the apex, reticulations subdistinct, edges revolute, equally green on each side. Petiole 0.15 cm. long, 0.3 cm. in diameter. Peduncle 2 cm. by 0.2 cm. in diameter, rachis 0.4 cm. in diameter, cylindrical. Pedicels 0.15 cm. long and 0.012 cm. diameter, glabrous. Sepals 0.1 cm. long, ovate acute, glabrous, margins very minutely ciliate. Umbel rigid. Corolla 0.7-0.8 cm. in diameter, outside glabrous, inside papillose, yellow with minute purplish markings. Corona scales outspread, white, broadly lanceolate, concave above, inner lobe erect acute, outer apex not recurved, acuminate.

Leaflets of Philippine Botany (1938) 1 May Vol. 10 Art. 131 p.3591; Enumeration of Philippine Flowering Plants Vol 3 (1923) p.353.

Hoya ruscifolia decaisne in De Condolle's Prodromus Vol. 8 (1844) p.639, Igorotes Mts., Callery, Luzon.

A subshrub, branched, leafy, leaves ovate, mucronate, apex acute, nearly sessile, veinless, extremely glabrous. Peduncles very short. Rachis also short, ovate. Follicles ovate acuminate, glabrous. A woody plant. Leaves supposedly like H. lacunosa var. pallidiflora. No flower available for description.

CONCLUSION

The last few pages of this book consist of four hoya descriptions for which no drawings were available. In addition I have in my possession, five species which appear to be new discoveries. I await the first flowering of these plants in order to determine if they are indeed new species.

There is no ending to this book, only a pause in order to do some more collecting, this study will continue as long as their are collection sites to be explored.

R.D.K.